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BEFORE THE
DEPARTMENT OF TRANSPORTATION
WASHINGTON, D.C.

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U.S.-U.K. ALLIANCE CASE	**Docket OST-2001-11029** - 34

SUPPLEMENTAL ANSWER OF NORTHWEST AIRLINES, INC. TO THE PROPOSED ALLIANCE OF AMERICAN AIRLINES AND BRITISH AIRWAYS AND ANSWER OF NORTHWEST AIRLINES, INC. TO THE PROPOSED ALLIANCE OF UNITED AIRLINES, BRITISH MIDLAND AIRWAYS, ET AL.

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Dated: December 17, 2001

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BEFORE THE
DEPARTMENT OF TRANSPORTATION
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U.S.-U.K. ALLIANCE CASE	**Docket OST-2001-11029**

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Northwest Airlines, Inc. ("Northwest") hereby submits its Supplemental Answer to the Joint Reply of American Airlines, Inc. ("American or AA") and British Airways PLC ("British Airways or BA"), and the Appendices thereto. Also submitted in this consolidated pleading is the Answer of Northwest to the joint application of United Airlines, Inc., British Midland Airways, Ltd., Austrian Airlines, Lauda Air Luftfahrt AG, Deutsche Lufthansa AG and Scandinavian Airline System for approval of, and antitrust immunity for, a bilateral alliance agreement between United Airlines ("United") and British Midland ("bmi") and a multilateral coordination agreement among all applicants.

This consolidated submission is organized as follows: the response of Northwest to the AA/BA joint reply is set forth under the heading "I. Supplemental Answer to AA/BA Joint Reply," and the response to the joint application of United and bmi is set forth under the heading entitled "II. Answer to Joint Application of United and bmi."

I. Supplemental Answer To AA/BA Joint Reply

American Airlines and British Airways have filed reams of paper, including most recently scores of Appendix materials purporting to offer an economic rebuttal to the likelihood of post-Alliance fare increases. However, none of these untimely filings can obscure the fact that approval of the alliance today would pose even more serious and durable consumer harm than was true in 1998.

- Concentration increases in U.S. – London markets are just as bad as they were in 1998, exceeding all thresholds of presumptive illegality established in the Department of Justice Merger Guidelines.

- U.S. – Heathrow remains a separate economic market, accounting for approximately two-thirds of air travel between the U.S. and London.

- Entry into Heathrow is extremely restricted because of slot scarcity and the control of slots by incumbents. British Airways' own documents take this condition as a given. So do the statements of the BAA and ACL. (NW Answer at 21-32).

- The only Alliance-specific consumer benefits are, charitably speaking, trivial. British Airways is retrenching, seeking to concentrate on point-to-point passengers and to shed less profitable connect operations at Heathrow and Gatwick. Not surprisingly, the only new service traceable to the Alliance would affect less than 2% of consumers – hardly enough to offset the enormous consumer welfare loss arising solely from the reduction in competition in air transportation service between the United States and Heathrow.

One need go no further than British Airways' own June 2001 Board Meeting memorandum to understand the long-term threat to competition posed by this Alliance. (BA 9034-50). There, the business case for the Alliance assumes that

(BA 9039), and that

(BA 9040).[1] Thus, the intended and foreseeable result of this

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1 In response to the Department's Order, BA has now produced an unredacted version of document BA 9034-50. The unredacted version shows BA's clear intent
(continued...)

Alliance is first and foremost to supplant competition with entrenched dominance in air travel between the U.S. and London.

The Applicants argue that the Department can ignore the competitive effects of their Alliance because new entrants will be able to secure slots and facilities at Heathrow without difficulty – an argument totally at odds with all evidence in the record, including the concessions made in BA's own internal documents. Equally meritless are the economic arguments propounded by anonymous consultants to American Airlines and British Airways, which cannot overcome the evidence of public harm clear from a straightforward application of the Merger Guidelines and from BA's own internal analysis. To the contrary, when the errors in those Appendices are corrected, the AA/BA models show that substantial post-Alliance fare increases would be profitable.

(...continued)

(BA 9034-36). Putting aside the question of whether BA can accomplish this strategy, the unredacted text shows

A. The Applicants Willfully Ignore The Evidence That U.S. – Heathrow Is A Separate Market, As Well As That Entry Into Heathrow Cannot Occur Without Substantial Slot Divestitures

1. U.S. – Heathrow Is A Distinct Market

The Applicants cling to their view that "London" should be viewed as a monolith when evaluating the competitive effects of this proposed Alliance despite overwhelming evidence that, for many passengers, Heathrow and Gatwick are not substitutes. Unable to avoid the conclusion of the Department of Justice in 1998 that U.S. – Heathrow service is a separate relevant market (DOJ Comments at 13-14), the Applicants are reduced to suggesting this is one of several "outdated conclusions reached by regulators on the prior proposed transaction." (JR at 6). There is, however, nothing the least bit outdated about this view. The facts underlying the DOJ's 1998 analysis of the relevant market have not changed during the past three years. Indeed, the internal contemporary documents of British Airways, which are far from outdated, corroborate that conclusion. (NW Answer at 9-10).

As British Airways' documents reflect, Heathrow commands premium business, higher yields, and an unsatisfied (and unsatisfiable) demand for Heathrow slots, which is incompatible with the asserted substitutability of Gatwick. (NW Answer at 7-10). If Gatwick were a true substitute for Heathrow, airlines like BA would expand their operations there, and slot values at Heathrow would fall. The reality is otherwise: Heathrow slots are (BA 3946), and hoarded by incumbents, and their values continue to increase. Moreover, BA seeks to concentrate its operations at Heathrow, not to expand at Gatwick.[2]

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2 *See* Emergency Joint Motion for the Production of Documents at 1-2 (Dec. 14, 2001) (describing a recent internal British Airways strategic planning study that reportedly recommends British Airways withdrawing from London Gatwick).

Although Applicants admit that the proper test is whether use of Gatwick is sufficient to discipline Heathrow fares (JR at 41), the evidence is to the contrary. Heathrow premiums would not exist if Applicants were correct. Thus, DOJ's 1998 conclusions remain valid today.

2. There Is Not A "Reasonable Availability" Of Heathrow Slots

In their Joint Reply the Applicants also attempt to escape from the statements of the BAA and ACL, as well as their own internal documents, that slot scarcity is a serious problem certain to endure for the foreseeable future. (NW Answer 21-22). Instead, they suggest weakly that there is a "reasonable availability of slots at Heathrow." (JR at 70). The assertion not only ignores the evidence but rests upon a complete failure to distinguish between the availability of *some* slots and the availability of a *sufficient* number and type of slots to allow entry capable of offsetting the competitive harm from the elimination of competition in the U.S. – Heathrow market.

In 1998, the DOJ "estimate[d] that LHR slots sufficient to operate roughly 24 additional daily round trips [336 weekly slots] would have to be made available as a result of the transaction and open skies in order to tip the balance in favor of approval." (DOJ Comments at 33). Northwest believes that today the slot divestitures needed to accommodate competitively important entry are larger. The specific plans for new service presented by other carriers in their Answers indicate that this number is 448 weekly slots. (NW Reply at 1-2 n.1). Moreover, they must fall into the times of the day which the market recognizes as commercially viable and be suitable for transatlantic widebody operations (NW Answer at 25; Exhibit NW-30), for even the Applicants concede there are "limit[ed] . . . time windows during which it is practical to operate flights." (JR at 38).

The number and quality of slots needed to temper the dominance created by the Alliance simply cannot be satisfied by the occasional trades and grey market purchases currently possible. (JR at 79). Not only is the grey market a function of a regulatory loophole which may well be closed (NW Answer at 26 n.29), it cannot operate to muster the slot availability anywhere close to the quantity and type needed to offset the loss of competition caused by the Alliance. No amount of argument can disguise the fact, as revealed in the statements of the BAA and ACL, as well as British Airways' own documents, that slot scarcity is, and will continue to be, a characteristic of Heathrow operations. (NW Answer at 21-32).

- "BAA expects only a few additional slots to be created at Heathrow, a small amount of which are expected within the hours that transatlantic flights are currently being operated. In addition, the new slots are likely to be departure slots and are unlikely to have accompanying arrival slots which would be required to make new services viable."[3]
- "In ACL's professional judgment, the opportunities to accommodate new entrant US carriers from the allocation of pool slots in the first two seasons are extremely limited."[4]
- "Opportunities to achieve significantly more slots than this through the mechanism of slot trading are difficult to quantify, as there is no established market in which potential buyers and sellers can 'advertise' their willingness to trade."[5]
- "In general, it is ACL's observation that there is a general unwillingness on the part of incumbent Heathrow carriers to divest of slots and the market is illiquid."[6]

Also constrained is the availability of facilities to support new operations, even if slots were available:

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3 Response of BAA plc, at 8 (Oct. 3, 2001); *see* Exhibit NW-29.

4 Response of Airport Coordination Ltd., at 5; *see* Exhibit NW-25.

5 *Id.*

6 *Id.*

- "It is conceivable that some new entrant airlines may receive a slot, from the pool, from inter-alliance transfers or through trading but the BAA would be unable to quickly provide the range and quality of facilities that an airline might need."[7]

- "Increasingly, in addition to the ongoing impact of runway constraint, the aircraft parking stand constraint is affecting airlines' ability to add new services. Unless there are enough large stands available in the peak periods to cope with this change in aircraft size, new services will either not be able to operate or will have to operate with smaller, less appropriate, aircraft."[8]

- "Stand capacity at Terminal 4 is a major constraint and is already at or close to maximum levels for the larger aircraft categories (B777/747) for peak morning hours. Additional wide-bodied aircraft (B777/747) could only be managed in if other services relocated to another terminal."[9]

- "Until Heathrow's Terminal 5 is approved, built and opened, [Autumn 2007 at the earliest] there is relatively little that can be done to relieve the aircraft parking and terminal capacity restraints."[10]

B. The Alliance Would Diminish Substantial Head-to-Head Competition On U.S. – London City Pairs And Allow The Parties To Raise Fares Profitably

The Applicants never even try to apply a Merger Guidelines test to determine relevant markets or accurately measure market concentration increases in such markets. Thus, the Applicants do not contest that an application of the Guidelines indicates substantially reduced competition flowing from increased concentration resulting from the merger. Because they cannot dispute the fact that the transaction would significantly increase concentration on critical overlap routes, American and British Airways propound alternative methods to support the proposition that "there is no likelihood that the proposed alliance will lead to higher prices." (JR at 19). These methods are displayed in Appendix A to the Applicants' Joint Reply, without

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7 *Id.* at 9; *see* Exhibit NW-26.

8 Paper on Issues & Principles, BAA plc, at 4; *see* Exhibit NW-26.

9 Response of BAA plc, at 4; *see* Exhibit NW-27.

10 Paper on Issues & Principles, BAA plc, at 4; *see* Exhibit NW-29.

attribution to the authors or even the authors' calculations. (Appendix A at 24-25; Appendix A.4). They are seriously flawed and wholly unreliable, as explained in the accompanying Statement of Dr. Robert J. Reynolds. (Hereinafter "RJR ¶").

As pointed out by Dr. Reynolds, the Applicants' submit Appendix A in support of the claim that the AA/BA Alliance could not profitably raise U.S. – London fares because "significant fare increases would 'likely' result in sufficiently large diversion of passengers that AA/BA profits would decline, rather than increase." (RJR ¶ 2). In an attempt to calculate the point at which a fare increase will cause enough passengers to turn to other choices, including lower priced seats on the same airline, as well as flights on other airlines, such that the fare increase would be unprofitable, the authors of these Appendices employ so-called "critical loss" and "critical elasticity" models. (RJR ¶¶ 2, 8-21).

As Dr. Reynolds explains, "[t]here is a fundamental flaw in the authors' analyses, however, because their assumptions and economic model are logically inconsistent. In particular, the authors assume that fares are almost 7 times the level of incremental costs. This is inconsistent with both the degree of competition in the industry, as specified in the authors' model as well as in the applicants' other submissions, and empirical evidence on the industry elasticity of demand for both business class and unrestricted economy class travel." (RJR ¶ 3).

With respect to the AA/BA Appendices' incorrect price-to-cost ratio, Dr. Reynolds explains further, "in any reasonably competitive industry where products compete primarily on price (i.e., are not strongly differentiated), these kinds of price-to-cost ratios are unsustainable" because "the incentives for the firm to expand profits by cutting price will be too large." (RJR ¶ 23). Indeed, under the Applicants' own view of industry competitiveness it should have been apparent that such implicit profit margins were far too great. It is by failing to account for the "opportunity cost" of foregone sales resulting from assumed price increases that the authors of the AA/BA Appendix are able to derive such unrealistic price-to-cost ratios. (RJR ¶¶ 9, 23). When Dr. Reynolds corrects these mistakes by using empirically-justified measures of industry demand elasticity, properly applied to their model, he finds that the price-to-cost ratio for business class is approximately 1.33, not the nearly 7 to 1 ratio assumed by the Appendix authors. (RJR ¶ 31).

Correcting these errors significantly changes the results of applying the AA/BA critical loss and critical elasticity models. For example, in the version of the AA/BA critical loss computations for the New York – London route that assume the incorrect incremental cost/price ratio of 0.15, the authors conclude that a 10% increase in the fare of a J-class ticket would be unprofitable when at least 10.5% of the J-class passengers would be diverted to other airlines (or choose not to fly at all). When Dr. Reynolds corrects that calculation by using a more reasonable value of 0.75 for the incremental cost/price ratio, he finds that 28.6% percent of passengers would have to be diverted as a result of the price increase in order to make a 10% increase in the J-class fare unprofitable. (RJR ¶ 28).

Dr. Reynolds' corrections to the critical elasticity approach use the empirically-justified estimates for industry demand elasticity, for both business class and unrestricted coach/economy class, and the corrected incremental cost-price ratios to compute the magnitude of the price increase which would be joint profit-maximizing for the Alliance partners. (RJR ¶¶ 29-35). Instead of showing that Alliance fare increases above 10% would be unprofitable, this corrected application of AA/BA's own model, shows that profitable increases in excess of 10% are probable. (RJR ¶ 35). Indeed, as corrected, the AA/BA model indicates that "business class fare increases . . . would likely exceed 10% on all the routes, and in some [would] substantially exceed that level." (RJR ¶ 35).

Finally, Dr. Reynolds uses a differentiated products methodology to test the validity of his corrections in terms of predicting the profitability of Alliance fare increases. (RJR ¶ 36). This approach is widely used by the Antitrust Division and the Federal Trade Commission to determine the effect of mergers on prices. (RJR ¶ 36 n.42). The methodology specifies that under certain conditions, where the merging firms are each other's closest rivals for a subset of consumers, a price increase which would have been unprofitable pre-merger can become profitable post-merger because consumers who would have defected to only one of the two rivals pre-merger are "recaptured" by the merged firm. (RJR ¶ 38). This approach produces predicted fare increases that are similar to those found with the corrected AA/BA model, and thus provides validation that those corrected results are reliable. (RJR ¶¶ 41-42).

These results are, of course, consistent with the presumptions underlying the DOJ Merger Guidelines, while those found by the authors of the flawed Appendices are not. Indeed, as Dr. Reynolds observes, certain mistakes by the Appendix authors, such as failure to consider U.S. – Heathrow as a separate market or to consider the implications of slot scarcity at Heathrow, make the reliability of their conclusions even more suspect. (RJR ¶¶ 5-6). But even without fixing mistakes as serious as these, Dr. Reynolds shows that AA/BA-sponsored models, once corrected even partially, predict that substantial fare increases will be profitable for the Alliance to implement. (RJR ¶¶ 35, 41-42).

C. The Asserted Alliance Benefits Are Trivial And Not Transaction-Specific

1. The Transaction Is Neither Motivated Nor Justified By Additional Online Service

In its Answer Northwest showed that 98.3% of AA/BA interline traffic also could travel on AA-SR/SN and other code share partners. (NW Answer at 43-45; Exhibit NW-47). In their Joint Reply, the Applicants argue that (1) this figure fails to account for traffic on routes for which AA and BA have not yet sought codesharing approval, and (2) the recent misfortunes of Sabena and Swissair have resulted in an inability to serve many of the routes on which American codeshared with those airlines. (JR at 55-57).

Regarding the first point, in analyzing the connectivity effects of the transaction the Applicants not only ask that the Department presume they will actually serve all of the routes for which have merely *sought* codesharing approval, but they now seek credit for all "potential points served by British Airways to which American could codeshare." (JR at 56 n.29). In fact, Northwest examined the connectivity benefits of the proposed Alliance both with respect to the code-share connections identified in the application (*see* Exhibits NW 46-48), as well as with respect to a hypothetical network-to-network combination that would account for all possible connections. (*see* Exhibits NW 49-50). Even with a hypothetical network-to-network combination, the incremental new connectivity available through the AA/BA Alliance would be trivial.

Regarding the notion that the current status of Sabena and Swissair make this transaction "even more compelling" (JR at 56), although there is uncertainty about the futures of Sabena and Swissair, the outcome of their reorganizations remains to be seen. Moreover, there is every reason to believe European hub-based operations of the type American has utilized will be available for network-to-network connectivity in the future. (NW Reply at 10 n.6). In fact, American (AA 070049), and (AA 070051).

Moreover, this post-hoc rationalization predicated on the misfortunes of Sabena and Swissair cannot obscure the fact that the Applicants have never privately considered this transaction one motivated by increased connectivity. Indeed, internal documents show BA's alliance with American was not conceived to afford but to reap the benefits (BA 6113). Put differently, this Alliance was put together for one purpose: to eliminate competition between BA and AA on U.S. –London service, not to build connectivity for flow traffic in the United States, Europe, or elsewhere. It is clear the Applicants anticipate that substantial benefits from their combination will derive from their consolidation, and all the evidence refutes the notion that connectivity benefits were what drove this Alliance. They clearly did not.

2. The Applicants' Reliance On Other Alliances To Suggest Lower Fares Will Result From This Transaction Is Misplaced

In their Joint Reply, American and British Airways theorize that the Alliance would produce lower connecting fares. In support of this claim they recapitulate the belated filings by their experts, Professors Brueckner and Ordover and Dr. Novy-Marx, made November 2, 2001. (JR at 61-64). As Northwest explained in its Reply Answer, even a cursory examination of these submissions show they fail to support the Applicants' request for immunity. (NW Reply at 7-11).

First, they altogether sidestep the statutory burden of proving that the purported benefits to interline service outweigh the harms to non-stop service by failing to acknowledge, much less quantify, the competitive harm arising from the loss of competition on non-stop transatlantic service to London-Heathrow. This is a fatal flaw since, even accepting a supposed annual benefit of $40 million on interline fares, the alliance costs on non-stop service suggested by a straightforward Merger Guidelines test applied to the billions of dollars of non-stop service adversely affected by the proposed alliance would overwhelm any potential benefit to interline passengers. Indeed, if Professor Brueckner had made the same 5% fare increase assumption in analyzing AA/BA that he employed in his earlier academic work, the results would have shown a price increase for gateway-to-gateway consumers on the order of nearly $200 million, rendering trivial the asserted $40 million in benefits Professor Brueckner purports to find for interline passengers in the AA/BA case. (NW Reply at 9-10).

Second, Professor Brueckner's interline fare benefit analysis vastly overstates any amount that is specific to the proposed AA/BA alliance, in the sense required by a Merger Guidelines analysis and by the Act. 49 U.S.C. § 41309(b) (public benefits must outweigh costs *and* not be available from less anticompetitive alternatives). As Northwest has shown, virtually all "new" interline traffic is already available through other European partners of American Airlines. (NW Reply at 10 n.6).

Third, even stranger than Professor Brueckner's analytical amnesia, is his curious failure to explain how his current enthusiasm for the AA/BA alliance can be squared with his conclusion only a year ago. At that time, when writing as an academic and not a consultant to American and British Airways, Professor Brueckner described the DOT's disapproval of the AA/BA alliance as "probably a prudent regulatory decision" in light of "the large volume of AA/BA gateway-to-gateway traffic." Brueckner & Whalen, *The Price Effects of International Airline Alliances,* 43 J. LAW & ECON. 503, 541 (October 2000).

Finally, the Applicants and their experts fail to appreciate that, unlike all prior alliances, which were predicated on large connectivity benefits arising from complementary networks and *de minimis* overlaps, here we have the exact opposite: competitive overlaps which dominate the transaction and dwarf the connectivity. The reason prior alliances created lower fares is that the increase in flow traffic was so great that the alliance partners had to increase capacity and service on the point-to-point bridge routes to accommodate the connect passengers. This output expansion naturally put downward pressure on price. The opposite is true here. Although the Applicants now profess "the future is in global network competition" (JR at 28), BA's words (captured in internal documents (NW Answer at 39)) and its deeds (reducing connecting passengers in favor of more lucrative point-to-point traffic) demonstrate this is not an alliance created or engineered to enhance connectivity benefits.

3. The Pursuit Of An Open Skies Agreement Neither Justifies Nor Necessitates Approval Of This Transaction

The promise of achieving an Open Skies agreement with the U.K. does not justify immunizing this alliance. The idea propelling such agreements is to replace bilateral restrictions that restrain competition and harm consumers with an open regime that fosters competition and new entry. If, however, as a prerequisite for obtaining an Open Skies agreement, the Department approves an AA/BA Alliance agreement that substitutes the *de facto* restrictions of an anticompetitive market structure for the *de jure* restrictions of the bilateral agreement, the Department will not have secured any public benefit. As the Department of Justice said of this proposed alliance in 1998: "If this transaction is to be viewed as the price for open skies, it is a high price." (DOJ Comments at 38). Three years later that price remains simply too high.

Moreover, the Applicants claim that there is a "narrow window of opportunity" for an Open Skies agreement with the U.K. – *i.e.*, that it is this deal or no deal. (JR at 3). This contention is unfounded. If this transaction is denied, despite claims to the contrary, British Airways will find another U.S. carrier with whom to partner.

(BA 6108-6109). Indeed, as BA explained to its Board, even without an Alliance with American,

(BA 9040).

Conclusion

The proposed AA/BA Alliance is anticompetitive by any responsible analysis. It lacks connectivity benefits characteristic of prior international alliances, and has all of the earmarks of an old-fashioned cartel seeking government sanction. If Open Skies is a public benefit, it is only because it fosters competition, not market dominance. This alliance will create all of the latter and none of the former.

II. Answer To Joint Application Of United And BMI

United and bmi, like AA/BA, seek antitrust immunity for a broad alliance which will allow the parties to fix prices for service between the U.S. and the U.K., including London Heathrow. Like AA/BA, the United proposal is said to be consistent with a yet-to-be-negotiated Open Skies agreement between the U.S. and the U.K.[11] However, approval of this transaction would only worsen the harm caused by an immunized AA/BA alliance. This is true because approval of the two alliances will cement control over the commercially-viable Heathrow slots in

[11] United has acknowledged that "a U.S.-U.K. open skies agreement is the predicate for the approval of both the American/BA and United/bmi applications." (United Answer at 6).

the dominant firms which seek immunity to eliminate competition, not expand it.[12] That control will inevitably exacerbate the barriers to entry at Heathrow. Unless substantial and timely new entry for U.S. carriers at Heathrow is assured, the two alliances will dominate transatlantic air travel for the foreseeable future.

A. Absent Significant Divestiture, New Entrant U.S. Carriers Will Be Unable To Obtain Slots And Facilities At Heathrow

As discussed earlier in the context of AA/BA, the record in this proceeding establishes beyond reasonable challenge that slots and facilities needed for new entrant U.S. carriers to launch service to Heathrow are not commercially available. According to BAA and ACL: (a) very few new slots will be created that could be used for transatlantic service, and those few slots likely will be for departures only; (b) incumbents are generally unwilling to part with slots, and there is no viable market for acquiring slots from incumbents; (c) the barrier to access caused by the lack of slots is exacerbated by the lack of aircraft parking stands and by terminal capacity constraints.[13]

Although the expert comments of BAA and ACL are sufficient on the scarcity of slots, the internal documents of the major Heathrow transatlantic incumbents provide powerful corroboration. The documents of British Airways are replete on this point. (NW Answer at 29-30). So are United's. For example:

- Regarding the availability of morning slots after 0700 (the main arrival period for transatlantic flights), a United official states,

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[12] As explained in Exhibit NW-30 to Northwest's November 2 Answer, commercially-viable slots for U.S. carrier transatlantic operations fall between 05:00 and 10:59 for Heathrow arrivals and between 10:00 and 15:59 for departures.

[13] *See* NW Answer at 21-22 and Exhibits NW-25 – NW-29.

(UA001306).

- Regarding the lack of parking stands at Heathrow, the official states,

(UA001307).

- In a document entitled

(UA001308).

United's own pleadings bemoan the lack of slots and facilities at Heathrow, notwithstanding that United and bmi collectively hold 17% of the commercially viable slots at Heathrow.[14] According to United, bmi and United together lack sufficient slots and facilities to mount a serious challenge to AA/BA at Heathrow, in part because the "short-haul narrowbody services such as those which bmi operates at Heathrow cannot be readily transformed into transatlantic wide-body services, even if well-timed slots were available, due to airport facility restraints in the hours of transatlantic operations."[15]

B. Approval Of The United-BMI And AA/BA Alliances Will Exacerbate The Entry Problem At Heathrow

As bad as the entry barriers at Heathrow are today, the situation will only be made worse by concurrent approvals of the United-bmi and American/BA alliances. Such approvals will

[14] *See* Exhibits NW-33 and NW-38.

[15] United Answer at 9 n.7. *See also* Consolidated Reply of United at 8.

hand these four Heathrow incumbents and their respective Star and oneworld alliance partners control over 75% of the commercially-viable slots.

The slot concentration problem is not limited to the four U.S.-U.K. carrier applicants, for it extends to their respective partners in the Star and oneworld alliances as well. As previously shown, the Star and oneworld alliances control a total of 75.4% of the commercially-viable slots at Heathrow.[16] (Exhibit NW-38). Thus, the vast majority of commercially-viable slots will be concentrated in the hands of United, bmi, American, BA and their alliance partners, and off-limits to prospective new entrants in the U.S. – Heathrow markets. Given the recognition that incumbents their slots and will not part with them (BA 3946), it cannot be expected that the dominant incumbents will volunteer to facilitate competition by selling slots at reasonable prices to competitors. The Department of Justice on this score was equally skeptical in 1998. (DOJ Comments at 21).

This reality underscores that concurrent approval of the United/bmi and American/BA alliances must be conditioned on the divestiture of commercially-viable Heathrow slots sufficient in number to permit meaningful new entry by U.S. carriers in U.S. – Heathrow markets. Only through timely and substantial entry made possible through slot divestitures can there be any chance of preventing AA/BA and United/bmi from raising fares through unilateral or coordinated interaction. (Merger Guidelines § 2)

In 1998, the Department of Justice estimated that it would take divestiture of 336 weekly slots to create the opportunity for competition with AA/BA. Since 1998, however, entry barriers

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16 When the holdings of Virgin Atlantic are included the total rises to 77.9%. Star carriers control 28.1% of the commercially-viable slots, oneworld carriers control 47.3% and Virgin controls 2.5%. (Exhibit NW-38).

have increased, with slot and facility scarcity more pronounced and enduring. Today, divestitures would have to be even more significant.

In its November 2, 2001 Answer to the AA/BA applications, Northwest estimated a minimum necessary divestiture of 420 commercially viable slots. (NW Answer at 2). That estimate was based in part on rough estimates of the slot requirements of other U.S. carriers. The answers subsequently filed by other U.S. carriers indicate that 448 slots are needed to accommodate competitive service: 98 slots for Northwest; 154 slots for Delta; 140 slots for Continental; and 56 slots for U.S. Airways. Unless the Department provides a mechanism to make these slots available for new entry, the United States will have sanctioned the prospect of anticompetitive fare increases for millions of consumers.

Conclusion

The United/bmi alliance would be a final nail in the coffin of competition. Together, the AA/BA and United/bmi alliance partners will control transatlantic service to the U.K. and to Europe, will hold over 75% of the Heathrow slots, and will marginalize the potential of other U.S. carriers to compete for international business. The result will be not only diminished competition for international passengers in direct contravention of Open Skies objectives, but a further weakening of the domestic carriers that cannot obtain competitive access to Heathrow.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on this 17th day of December 2001, a copy of the foregoing Supplemental Answer of Northwest Airlines, Inc. was served by first-class mail, postage prepaid, on the following:

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I. Introduction

1. I have been asked by Northwest Airlines to review the technical Appendices A and A.1 through A.6 furnished in support of the American Airlines and British Airways joint application for antitrust immunity. I am Chairman of Competition Economics, Inc., a consulting and research firm located in Washington, DC. I have done extensive work on airline industry matters over the past decade. I have also taught and done research in microeconomics, particularly as applied to industrial organization, antitrust and regulation, and served at the Antitrust Division of the U.S. Department of Justice. My curriculum vitae is provided in Attachment A to this Statement.

2. The authors of AA/BA Appendix A (and related Appendices A.4 through A.6) claim that the AA/BA Alliance operating between the U.S. and London could not profitably raise fares because significant fare increases would "likely" result in a sufficiently large diversion of passengers that AA/BA profits would decline, rather than increase. The authors of these appendices attempt to calculate the point at which a fare increase will cause enough passengers to turn to other choices, including less expensive seats on the same airline as well as alternative flights on other airlines, such that the fare increase would be unprofitable. The authors use "critical loss" and "critical elasticity" analyses (defined in Section II below) to support this claim.

3. There is a fundamental flaw in the authors' analyses, however, because their assumptions and economic model are logically inconsistent. In particular, the authors assume, in their base case, that fares are almost 7 times the level of incremental costs. This is inconsistent with both the degree of competition in the industry, as specified in the authors' model as well as in the applicants' other submissions, and empirical evidence on the industry elasticity of demand for both business class and unrestricted economy class travel. By correcting their approach, I show that use in their model of empirically justified measures of demand elasticity implies that fares are much closer to incremental costs (e.g., business class fares are only about one-third larger than incremental costs). This corrected ratio between fares and incremental costs is also consistent with airline fare structures including proper accounting for the opportunity costs

associated with particular fare classes in measuring the relevant incremental costs.

4. Correcting the authors' critical loss and critical elasticity analyses shows that their models would predict fare increases greater than 5 to 10% on the routes served by AA and BA between the U.S. and London. The foregoing conclusion applies not only to business class (J) fares but also generally to other fare classes not considered by the authors, as well as to routes between the U.S. and Heathrow, which are not considered separately by the authors. Further, I examine the predicted fare effects in an alternative, "differentiated products" model of competitive interaction, which is often used by U.S. antitrust agencies. Using the corrected assumptions regarding incremental costs and industry demand elasticity, this model also results in significant predicted fare increases.

5. The AA/BA Appendix A and related Appendices are also deficient in that the authors ignore the slot scarcity problem at Heathrow. This omission reflects a bias consistent with other errors in their analyses. Taking the slot constraints into account would, if anything, increase the expected fare increases predicted under the Appendix methodology when other mistakes are corrected.

6. The authors also make arguments that there is a high degree of substitution, and willingness to substitute, by passengers flying between the U.S. and London with respect to key choices such as whether to select non-stop vs. one-stop flights or to purchase restricted vs. unrestricted fares. Similarly, they implicitly assume that there is a high degree of substitution with respect to which London airport to use (Gatwick vs. Heathrow). However, the authors fail to provide any reliable evidence to support the asserted passenger flexibility on these options, nor do they test the effects of alternative assumptions, such as for the routes between the U.S. and Heathrow.[1] But even putting aside these issues, my conclusion is that, when the methodological errors in the AA/BA analyses are corrected, their own models show that the

[1] Attachment C to this Statement discusses the information provided in the AA/BA Appendices aside from the critical loss and critical elasticity analyses described below.

Alliance would be able to increase fares profitably by significant amounts.

7. This Statement is organized as follows. Section II provides a brief summary of the AA/BA Appendix authors' critical loss and critical elasticity assumptions. Section III explains where their analyses are wrong and corrects their errors. Section III also shows how their model, when corrected, supports the proposition that significant price increases post-Alliance would be profitable. Section IV provides a brief summary.

II. The Authors' Critical Loss and Critical Elasticity Analyses

8. In the Critical Loss appendix,[2] the authors attempt to calculate the minimum amount of diversion which would render a "small but significant non-transitory" price increase (which they refer to as a "SSNIP") unprofitable for an immune alliance of BA and AA on U.S. to "London" routes. In the Critical Elasticity discussion (Appendix A.5) the authors purport to compute the minimum route demand elasticity such that a SSNIP price increase would be unprofitable for BA and AA if they were to receive antitrust immunity on U.S. to "London" routes.[3]

9. As a threshold matter, it is important to identify certain deficiencies about the authors' work that pervade the Appendices:

First, the authors' calculations are based on certain key assumptions. For **none** of these is **any** empirical evidence utilized;

Second, the authors reach a conclusion about whether a price increase would be

[2] Principally in Appendix A.4, although the analysis is summarized in the "flip charts" of Appendix A.6.

[3] The methods used by the authors of the AA/BA Appendices, as well as the differentiated products model which I discuss in Section III, are all "unilateral effects" models (i.e., neither the authors of AA/BA Appendices A and A.1 through A.6, nor I, depend on assumptions regarding coordinated interactions).

profitable based on their implicit judgment that diversion resulting from a price increase would exceed the "critical loss" amount. However, the diversion that would result would depend on the elasticity of demand facing the alliance partners. At **no** place do the authors provide any empirical evidence that the actual diversion would be this amount (or more);

Third, throughout, the authors combine data for Heathrow and Gatwick, without **ever** computing "critical" values for routes to Heathrow;

Fourth, throughout, the authors use a ratio of incremental costs to price[4] which would be valid only if, contrary to fact and the applicants' position, each airline had considerable market power. In other words, to sustain the level of price over incremental cost that the authors assume would require each airline, AA and BA, to be insulated from competition;

Fifth, they drastically understate the ratio of incremental costs to price. This occurs primarily because they fail to recognize any opportunity costs from selling an "unrestricted" non-stop seat to a local O&D passenger. If the airline does not book an unrestricted non-stop passenger on a particular U.S. to "London" non-stop route, then it may be able to sell (one or more) seat(s) to a restricted non-stop passenger(s) on that route or to a (restricted or unrestricted) connecting passenger(s);[5] and

Finally, the authors misuse a 5 to 10% ("SSNIP") increase to evaluate the alliance. The authors claim that such price increases "... are consistent with the so called SSNIP

[4] Their "base" ratio of incremental cost to price is 15%. They also do some "sensitivity" tests with a 40% ratio.

[5] To an economist, this reflects the principle of measuring costs in terms of "opportunity costs." I note that airline revenue management systems commonly limit the number of available restricted seats in order to reserve space for unrestricted fare passengers; an airline would make more restricted seats available if it anticipated fewer unrestricted passengers.

methodology used in merger enforcement" (at p. 34) and cite, on the preceding page, the Merger Guidelines of the Department of Justice and the FTC. However, the US antitrust agencies have consistently made it clear that while the SSNIP approach applies to testing whether some product (or area) constitutes an antitrust market, it does **not apply** to determining whether a merger is acceptable.[6] That is, the antitrust agencies have not said that they view a merger which results in a 5 or 10% price increase as acceptable.

A. Critical Loss

10. In this analysis the authors attempt to calculate the minimum amount of diversion which would render an "SSNIP" price increase to "business" travelers unprofitable. An increase in unrestricted fares increases the airline's profits from those who continue to fly at the same fare class level. However, the fare increase is likely to "divert" some traffic: some passengers may choose to fly another airline (or not fly at all) and others, while continuing to fly that airline, may fly in a lesser fare class (e.g., instead of at an unrestricted Y fare at some restricted coach fare). Either type of diversion results in a profit sacrifice to some extent: a passenger who is lost to the airline represents a loss of profits equal to the difference between price and incremental cost; a passenger who continues to fly the airline but in a lesser fare class represents a loss equal to the difference in margin (price minus incremental cost) in the original versus the lesser fare class.[7]

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[6] The DOJ/FTC *Horizontal Merger Guidelines* (1992/1997) explicitly state that "the 'small but significant and non-transitory' increase in price is employed solely as a methodological tool for the analysis of mergers; *it is not a tolerance level for price increases*." (Section 1.0; emphasis added). Werden (Gregory J., "Market delineation under the Merger Guidelines: a tenth anniversary retrospective." *The Antitrust Bulletin*, 1993, Fall, p. 517-555) affirms that the SSNIP "is not the standard for determining whether a merger will be challenged. Mergers may be, and certainly have been, challenged even though they were unlikely to increase price as much as five percent." (p. 536). In fact, in the DOJ's challenge in U.S. v. Vail, one of the concerns raised was that "if a merger were allowed to take place, there would be an overall average increase in lift ticket prices on the order of 4%." (U.S. and Colorado v. Vail Resorts, Inc, "Competitive Impact Statement." No. 97-B-10, 1997, p. 12).

[7] For example, if the passenger initially paid $2000 for "J" class and represented incremental costs of $1200 and, after the increase, would pay $1500 to fly unrestricted "Y" with incremental costs of $1000, the airline's lost profits would equal $300 [($2000-1200) - ($1500-$1000)], the

11. The authors attempt to determine the minimum proportion of the unrestricted passengers which if "diverted" would render the price increase unprofitable. To illustrate the nature of the critical loss calculations, consider an example where there were 1000 passengers flying in "J" (business class) prior to the increase at a fare of $2000. A 10% increase would produce a gain of $200 for each passenger who continues to fly in J-class on that airline; if none diverted, the net gain would be $200,000. However, if 100 (10%) diverted, one-half to lower fares on that airline and one-half to other airlines (or not flying at all), the net gain would be reduced: the "profit" (or contribution to overhead) lost from the 50 who no longer fly which might be, for example,[8] $40,000 (50 times $800) and the contribution reduction from the 50 who fly at a lower fare level might be $15,000 (50 times $300). The net gain, under these assumptions, would be reduced (compared to the no diversion case) to $125,000 [i.e., 900 times $200, or $180,000 (since only 900 are not diverted) less ($40,000 + $15,000)].

12. The "critical loss" just balances the profit gain from those who continue to fly vs. the reductions stemming from diversion.[9] As the example indicates, in order to compute the values for components of the calculation, it is necessary to know:

(1) the difference between price and incremental cost (the "margin") for each of the unrestricted fare classes;

(2) the "margins" for each other fare class which might be used by those diverted passengers who continue to fly the airline but in a lesser fare class; and

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difference between the margin at the original versus downgraded fare level.

[8] Under the hypothetical assumptions of footnote 7, where the profit margin in J-class was $800 per passenger and the difference between the J-class and Y-class margins was $300.

[9] Under the hypothetical assumptions stated in footnote 7 (including incremental cost/price ratios of 0.6 to 0.67), the critical loss proportion would be 26.6%, with 13.3% being diverted to lower fares and 13.3% to other airlines. (133 times $800 plus 133 times $300 approximates the increased profits from those who continue to fly on that airline at the higher fare level: $200 times 734 passengers [i.e., 1000 x (1 - 26.6%)].

(3) the proportion of "diverted" passengers who remain with the airline, albeit who downgrade, instead of flying with another airline.

13. Although all of this information is necessary to compute the critical loss, the authors provide no empirical evidence for any of the components. Instead of evidence, they simply use a range of assumed values for the "margin" and for the proportion of diverted passengers who downgrade. However, as explained in Section III, the likely margin lies well *outside* the range they use.

14. The authors then apply these assumed values to U.S.-"London" routes. They find, under their base case assumptions,[10] that for an increase of 10% in the "J" fare,[11] the critical loss percentage is "...roughly 11-12%." (at p. 36). Using a somewhat higher ratio of incremental costs to fare (i.e., 40%) as a "sensitivity" test, they compute critical loss percentages of "...15.70% to 16.25%" (at p. 37).

15. Citing these calculations, the authors state that their critical loss analysis "supports" the finding "[t]hat AA/BA would find a fare increase unprofitable by virtue of the resulting passenger diversion" (Appendix A, page 25). Although the authors conclude that actual diversion is likely to be larger than these (claimed) critical loss proportions – and, therefore, the 10% price increase is likely to be unprofitable – at **no** place do they provide any empirical support for this conclusion.

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[10] I.e., incremental costs equal to 15% of the fare (that is, an 85% incremental margin) and that 25% of diverted passengers choose a lower fare on the same airline.

[11] I note that the authors report results for only *one* unrestricted fare class, the "J" (business) class and for only *one* fare increase percentage, 10%. The authors should have provided critical loss values for raising the F, J, and Y fares separately and in combinations; they do not. An airline might be able to profitably raise prices for one fare class but not for other fare classes. Hence, analyzing a price increase for only one particular type of fare may be insufficient to infer the effect of increases for other fare classes. Further, the different fare classes are substitutes. That means that a firm may maximize profits by increasing all fares at once. Analyzing a single fare increase may then underestimate the incentives for the fare increases. (In addition, I note that the authors have chosen not to provide the details of their data or their calculations.)

B. Critical Elasticity

16. While the authors focus on the critical loss analysis, they also provide another approach which they refer to as "critical elasticity."[12] The critical elasticity could be usefully defined as the smallest value of "market" (OD route) demand elasticity for which a specified price increase (e.g., 5 or 10%) is unprofitable.[13]

17. This might be computed as follows. Suppose, as above, that the Alliance were to raise price for unrestricted passengers by 10%. This would reduce traffic on the route, the extent of the reduction depending *inter alia* on the OD demand elasticity. Assume that all of the route demand reduction were borne by the Alliance. This loss of customers would tend to reduce the Alliance's profits: the magnitude of the resultant reduction in profits would, as above, depend on the airlines' "margin" (price less incremental costs) on these customers. Whether the airlines' overall profits rose or not would depend on the increased profits on those who continued to fly it versus the lost margin from "lost customers."

18. For example, if the route demand elasticity were 1.0,[14] a 10% fare increase in the relevant fare class(es) would reduce traffic on the route by (about) 10%. Thus, if route traffic in the class had been 3000 before the increase, it would fall by about 300 passengers. Under the authors' assumptions all of this decline would be borne by the Alliance.[15] If they had 1000 passengers in

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[12] Unlike the critical loss analysis, the critical elasticity computations do not explicitly account for passengers downgrading to lower fare levels.

[13] The authors state: "Another way to approach the same issue, namely the likelihood that a SSNIP would be unprofitable, is to examine the demand elasticity facing the Alliance. If the demand elasticity facing the Alliance is sufficiently large, then a postulated price increase – the hypothesized SSNIP – *will be unprofitable.*" (A.5, p. 43; emphasis added)

[14] In absolute value.

[15] The authors claim that their demand model of Appendix A.5 is "...conservative, i.e., biased toward a calculation that predicts a profitable SSNIP..." (p.43). However, the model tends to

the class before, this would be a fall of 30% in their traffic.[16] Thus, in this example, if the gain from increased fares on the traffic they continued to carry was just marginally less than the reduction in contribution from lost passengers[17], then 1.0 would be the "critical elasticity".

19. Using the above approach, **if** the authors had empirical evidence on margins, then a critical elasticity could be computed. And the critical elasticity value could then be compared to estimates of demand elasticity from the literature in order to assess whether the actual demand elasticity exceeds the critical level. But the authors do **not** use or provide any such evidence on margins; as in their critical loss analysis (see above), they only **assume** a ratio of incremental costs to price.

20. Further, the authors deviate significantly from the above approach: rather than trying to compute whether a specified price increase (e.g., 10%) would increase the alliance's profits (which is what they claim to do),[18] they instead calculate whether such an increase is *more profitable than some other increase.*[19] Using this approach, for example, even if a 10% price

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exaggerate the loss of customers as a result of a price increase. Under the assumptions of the model, the airline that raises prices absorbs the entire resulting loss in the market demand. For example, suppose that route demand elasticity was 1.0. A 10% increase in price would reduce total route traffic by (about) 10%. Hence, an airline with a 10% share of the traffic, would, under the authors' assumptions, lose nearly all of its passengers.

[16] Obviously, the proportionate decline in traffic would, in the authors' model, depend on the share of the alliance before the price increase; if for example, the alliance had a 50% share (1500 passengers), the decline would be 20%.

[17] In terms of the example in the text, if the old fare was $2000, a 10% increase would raise fare by $200 on each of the remaining 700 passengers or by $140,000. If the margin on each of the 300 lost customers was $470, then the margin loss from those customers ($141,000= (300 times $470)) would just slightly exceed the gain from increased fares. Therefore, the critical route demand elasticity would be about 1.0, *assuming* this margin and a one-third share of passengers for the airline.

[18] See the quotation in footnote 13 above, particularly the emphasized words.

[19] Technically, the authors compute the profit after a specified "SSNIP", which profit is defined as "V" in their equation (2). By subtracting the profits before the increase from the value

increase raised the Alliance's profits materially, it would be deemed "unprofitable" by the authors if a different price increase (e.g., 9.7%) raised the Alliance's profits by a somewhat greater amount.

21. The results of these computations are, moreover, only as good as their assumption on incremental costs: since, as explained in the next section, their assumption is totally at variance with reality, their "critical elasticity" estimate is worthless.

III. Critique of the Critical Loss/Elasticity Analyses, and Correct Methods

A. Critique

22. As mentioned above, the authors' critical loss and critical elasticity analyses are fatally flawed and unreliable in the following respects:

- They make key assumptions while providing no empirical evidence to support them and without verifying that their implications hold;

- They reach conclusions about whether a (specified) price increase is unprofitable based on the "critical loss" (or "critical elasticity") without having provided any evidence that the extent of diversion was likely to exceed such critical levels;

- They compute a so-called critical elasticity which does not determine whether an

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calculated in (2), they could have determined whether, under their assumptions, the hypothesized price increase raised Alliance profits. Alternatively, by examining whether the derivative of V is greater than zero when measured at the pre-Alliance price level (in their notation, the derivative when k=0), they could have determined whether some price increase would result. Instead, they ask whether *further* increases in price, *beyond* the hypothesized "SSNIP" increase, would have the *incremental* effect of raising or lowering Alliance profits (i.e., whether the derivative of V with respect to the k measured *at the hypothesized price increase level, k,* is positive or not). (I also note that there appears to be a typo in Equation (2): "kp" should be "kp^0").

"SSNIP" is profitable but instead merely whether *further* increases would be profitable; and

- They use analytically and empirically insupportable assumptions about price-to-cost ratios or margins.

23. In this section I illustrate the unreliability of the authors' conclusions by focusing on one of their most serious errors. The authors' base assumption is that the ratio of incremental costs to price is 15%; equivalently that the ratio of price to cost is nearly 7 to 1 (6.67:1).[20] In any reasonably competitive industry[21] where products compete primarily on price (i.e., are not strongly differentiated), these kinds of price-to-cost ratios are unsustainable.[22] Simply put, the incentives for the firm to expand profits by cutting price will be too large. Nor is there any reason to believe that such ratios hold in airlines. In fact, as shown below, when we use empirical estimates of demand elasticity and the authors' model, the implied cost/price ratio is substantially higher than those used by the authors.[23]

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[20] For "sensitivity" purposes, the authors also use a cost price ratio of 0.4, equivalent to a price to cost ratio of 2.5.

[21] Which the applicants believe characterizes airlines. See, for example, *Joint Application of American Airlines, Inc. And British Airways PLC for Antitrust Immunity*, page 36, "The U.S.-U.K. market includes some of the world's most dense and competitive routes. ... Indeed, the U.S.-U.K. market is already fiercely competitive, with nonstop service by more major carriers than any other U.S. Europe market."

[22] For example, in the limit, if there is no product differentiation (and no capacity constraints), then the sustainable price/cost ratio from (Bertrand) price competition is 1.

[23] It is important to note that the appropriate measure of incremental cost depends on the question that is being addressed. As discussed further below, when considering the effects of a fare increase for unrestricted passengers, which is what the authors of the AA/BA Appendices are doing, it is appropriate to include in incremental costs the opportunity costs associated with the passengers who are displaced by an additional unrestricted passenger. In other contexts, however, it may not be appropriate to include such opportunity costs when measuring incremental cost. For example, an airline considering a fare decrease, particularly in response to a rival airline's fare reduction, must consider the prospect that it will fly substantially empty aircraft if it does not respond; the appropriate incremental cost in that context is likely to be

24. Why did the authors understate the cost/price ratio? The primary reason is evidently that the authors do not recognize the importance of measuring opportunity costs. The airline has as alternatives selling a ticket(s) in a lower fare class (e.g., a restricted ticket) to a passenger who is traveling between a U.S. city ("X") and "London" or a ticket to a "connecting" passenger (e.g., flying between Y and London over X, or between X and Z over London, or between A and B over X and London).[24] The pertinent incremental costs are those related to the airline's choice of fares and *fare structure*: for these, the airline must consider the opportunity cost of seats.[25] In

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much lower, in part because the opportunity costs are negligible. As another example, the opportunity cost at the route level will be relatively low for a passenger who simply appears at the airport without an advance reservation, but that situation is also different from the issue considered in the AA/BA Appendices.

[24] The "opportunity cost" for unrestricted passengers generated by such alternatives will be higher than that suggested by the relative fares. The reason is that unrestricted passengers impose higher costs (both direct costs and, because of their "late booking", uncertainty and load factor penalties.) The authors acknowledge these uncertainty and load factor "penalties" in their "critical loss" analyses when they consider 70% to be the load factor "ceiling" applicable to business cabins. The logic of this "ceiling" is explained by them as follows: "First, booked passengers who change their travel plans close to departure provide the carrier with little opportunity to re-sell the seats. Second, airlines on many flights will reserve a certain number of seats for last minute demand. To the extent this demand does not materialize as predicted, seats that were closed in terms of their availability will nevertheless be empty when the flight departs. In both of these examples, the load factor percentages will reflect empty seats that were, in reality, not available." (Appendix A.4, footnote 46)

Further, physical differences among the seating configurations in first, business, and coach cabins enhance the "opportunity cost" for unrestricted seats. As explained in Appendix B to the Joint Reply, "BA, for example, offers fully-flat beds in both its first and business (or "Club World") class cabins", and "World Traveler Plus passengers are provided a dedicated cabin with greater leg room and other amenities." (Appendix B, page 8). The differences between these "premium" and standard "coach" configurations mean that a "premium" seat effectively "crowds out" more than one "coach" seat. In fact, information regarding BA's aircraft reported in the FLEET/Lundkvist aircraft "Fleet" database (published by Back Associates) suggests that coach seats replace first or business seats by ratios above 2 to 1 when first or business cabins are reduced or eliminated.

[25] Oum, et.al., consider the effects of opportunity cost of space on an aircraft in computing the relative marginal costs of different fare classes. See T.H. Oum, D.W. Gillen, and S.E. Noble, "Demands for Fareclasses and Pricing in Airline Markets," *The Logistics and Transportation Review*, v.22, n.3, 1986, pp. 195-221 (referred to hereafter as Oum, "Demands").

other words, for each such choice, the loss of sales in each such category results in lost revenues, which represent an opportunity cost. In fact, an important activity for an airline is to design a *fare structure* and yield management system to optimize revenues, taking such passenger tradeoffs into account.[26]

25. However, the Appendices analyses completely ignore this reality. In so doing, the authors reach unreliable and inaccurate conclusions.

B. *The AA/BA Models, When Corrected, Demonstrate That Post-Approval Increases In Alliance Fares Would Be Profitable*

1. Revised Margin and Cost/Price Ratio

26. The authors could have used their critical loss and critical elasticity approaches in a more sensible, and logically consistent way. This would involve, first, using a plausible estimate for "market" (route) demand elasticity, based on the empirical literature, to *estimate* (not assume) a ratio of price to cost that is *consistent* with profit-maximization of AA and BA prior to the Alliance. Such estimation is based on determining the ratio of price to cost which, prior to the Alliance, would have been consistent with profit maximization by both AA and BA, given the

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[26] American Airlines appears to recognize the "opportunity cost" concept in its yield management. A paper written by (then) employees of American Airlines Decision Technologies explains:

> American's decision to accept or reject the next (or marginal) request for a discount seat can be illustrated using a decision tree (figure omitted). If it accepts a discount request, the revenue it earns is the discount fare. If it rejects these discount request [sic], two outcomes are possible. First, rejecting the discount request may result in an additional empty seat and no additional revenue. Second, all the remaining seats may be filled with full-fare passengers, because sufficient full-fare passenger demand exists (the flight sells out) or because discount-fare passengers choose to pay full-fare when told the discount fare is not available (sell-ups).

(See B.C. Smith, J.F. Leimkuhler, and R.M. Darrow, 1992, "Yield management at American Airlines," *Interfaces*, 22(1), 8-31.) It is clear from this description of discount seat allocation that American Airlines is fully aware of a seat's "opportunity cost."

route demand elasticity and the authors' model of competitive interaction.[27]

27. To do this, I first computed the margin and cost/price ratio for business class,[28] using a "market" elasticity of 1.0 for business class tickets, which is consistent with prior estimates.[29] I also assumed that the AA and BA business travel shares are 25% each. Applying these conditions to the authors' model used in their critical elasticity analysis, I obtained an implied incremental cost/price ratio of 0.75.[30] For analyzing unrestricted coach/economy class, I used an elasticity of demand equal to 1.25,[31] which implies an incremental cost/price ratio of 0.8.

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[27] i.e., a price/cost ratio which would lead each airline to be on the margin between raising and lowering price in the pre-Alliance period.

[28] When I refer to business class, I include the J and C classes, which are the non-discounted business class categories specified in IATA Resolution 728. (The authors of AA/BA Appendices A and A.1 through A.6 refer to "J" class without specifying whether that is the only fare code that they include in their business class analysis.) Likewise, for the unrestricted coach/economy class, I include the Y, S, and W classes, which are the non-discounted economy/coach class categories specified in IATA Resolution 728.

[29] See the survey of airline demand elasticities by Oum et.al. (T.H. Oum, W.G. Waters II, and J. Yong, "Concepts of price elasticities of transport demand and recent empirical estimates: an interpretative survey," *Journal of Transport Economics and Policy*, May, 1992, pp. 139-154; this paper will be referred to hereafter as Oum, "Concepts"). That study indicates that demand elasticity for business travel is found to be somewhere in the range between 0.65 and 1.15.

[30] This means that an incremental cost/price ratio of 75% is consistent with profit maximization behavior by both AA and BA prior to the merger. Note that the equilibrium cost/price ratio derived in this manner depends on both the elasticity of demand and the firm's share. An elasticity of 1.0 and a share of 40%, for example, implies an incremental cost/price ratio of 0.6.

[31] This is within the range found by Oum, "Demands." They use data for 200 U.S. domestic routes and report (pp. 207-209) that the "elasticity for the first class services varies roughly between 0.6 and 0.8 ...elasticity for the economy fareclass ranges roughly from 1.2 to 1.35 ... [and] for the discount fareclass varies substantially across routes, lying roughly between 1.5 and 2.0."

2. Corrected Critical Loss and Critical Elasticity Techniques

a. Critical Loss

28. The authors' critical loss computations are based on Equation A in Appendix A.6 (p. 10). The critical loss analysis depends to a large extent on the assumed value of the incremental cost/price ratio. Consider the critical loss computations for the New York - London route. Assuming no "downgrade" recapture (i.e., no passengers who continue to fly the airline but at a lower fare) and an incremental cost/price ratio of 0.15, the authors compute that a 10% increase in the fare of a J-class ticket would be unprofitable when at least 10.5% of the J-class passengers would be diverted to other airlines (or choose not to fly at all). If I repeat this calculation but with an incremental cost/price ratio of 0.75, I find that 28.6% percent of passengers would have to be diverted as a result of the price increase in order to make a 10% increase in the J-class fare unprofitable. The authors similarly underestimate the critical loss needed to make price increases unprofitable when some of the "diverted" J-class passengers are "recaptured" by less expensive fares on the same airline.

b. Critical Elasticity

29. The corrected critical elasticity approach uses the estimates for "market" demand elasticity discussed above and the estimated cost/price ratios to compute the magnitude of the price increase which would be joint profit-maximizing for the Alliance partners. I first computed the price increases for business class tickets, using a market elasticity of 1.0. For example, suppose that the AA and BA business travel shares along the relevant routes are each 25% and that the implied incremental cost/price ratio is 0.75. Using this incremental cost/price ratio and the authors' demand model, the post-alliance fare increase for business travel would be

approximately 12.5%.[32]

30. Similarly, the predicted fare increases for unrestricted coach/economy class fares, can be computed. For example, using an elasticity of route demand equal to 1.25 and the incremental cost/price ratio of 0.8 discussed above, and 25% shares each for AA and BA, then the predicted post-Alliance fare increase for unrestricted coach/economy class fares would be approximately 10%.[33]

31. It may be useful to spell out why the results of the revised critical elasticity technique are so different than what the authors report. The logic of the above analysis is as follows:

- The "market" (OD route) elasticity is specified. For business class, an elasticity of 1.0 is consistent with the empirical demand estimation literature cited above. It is also consistent with articles cited by the authors in their Appendix A.3.[34]

- Given the authors' model, the elasticity facing each of the firms pre-Alliance is equal to (1/s) times the "market" elasticity, where "s" is the firm's share of OD traffic.[35] That is, under the authors' assumption, all of the reduction in OD traffic resulting from an increase in fares would be borne by the firm. We apply this

---

[32] This price change is computed by analyzing the equilibrium conditions prior to the Alliance and comparing them to the post-Alliance equilibrium. The equilibrium is constrained by the marginal conditions imposed by the "market" demand function. Namely, in equilibrium the firm with the largest share must not have any incentive to raise prices (since the incentives to raise prices are strongest for the firm with the largest share). I further assume that the marginal cost is the same for both of the equilibria.

[33] These calculations are described further in Attachment B to this Statement.

[34] They cite an estimated elasticity of 1.07 for "excursion fares" (i.e., requiring a 2 week stay) on North Atlantic international routes, from J. Park and A. Zhang, "An Empirical Analysis of Global Airline Alliances," *Review of Industrial Organization*, June 2000.

[35] For example, if s = 0.25, then the elasticity facing the firm would be 4 times the OD elasticity. Hence, if the OD elasticity is 1.0, then a 25% share firm's elasticity would be 4.0.

model to both *pre* and *post* Alliance pricing.

- Given the authors' model, this elasticity of demand for the firm implies a level of the price-cost ratio which is consistent with profit-maximization. That is, the profit-maximizing price-cost ratio is:

  $$\text{Price/cost} = 1/(1 - (1/n_f))$$

  where n_f is the demand elasticity facing the firm. With an OD elasticity of 1.0 and a share of 25% , the authors' model implies a price/cost ratio of about 1.33 (i.e., incremental costs of about *75%* of the price).

32. That is, if instead of simply **assuming** a cost/price ratio of 15%,[36] the authors could have **derived** a cost/price ratio consistent with profit-maximization pre-Alliance. If they had done so, then they would have estimated very substantial price increase effects. Stated alternatively, the cost-price ratio **assumed** by the authors is economically **inconsistent** with their own model and other assumptions.[37]

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[36] In the authors' base case. They also perform a "sensitivity" test using a 40% cost price ratio.

[37] An important question not addressed by the AA/BA analyses is how capacity constraints would affect the likelihood of post-Alliance fare increases. This question is particularly pertinent for the Alliance due to the fixed landing slots at Heathrow. The capacity constraints associated with fixed landing slots could result in a higher ratio of fares to incremental cost than could otherwise be sustained, particularly if one ignores the opportunity costs associated with the slots. It should be noted, however, that the authors of the AA/BA Appendices do not mention fixed landing slots as a possible justification for the high ratio of fares to incremental cost that they assume. Further, the applicants have denied that capacity constraints associated with fixed landing slots are a significant issue. Moreover, if prices on routes to Heathrow were nearly 7 times incremental costs whereas on routes to other, non-slot constrained airports they were only 1.33 times incremental costs, this model would indicate that fares to Heathrow are about 5 times those on comparable routes; this is not what the applicants have argued. A proper treatment of these of these capacity constraints would require modifications to the analysis used by the authors of the AA/BA Appendices, with more focus on the shares of slots held by AA and BA at Heathrow: high shares of landing slots held by the Alliance may lead to significant fare increases.

33. In addition, I would note that the *magnitude* of the price increase will depend on the *shape* of the demand curve above the current price level.[38] The authors use a demand curve that has a linear (straight line) shape. Many empirical analyses, however, use a demand curve which, over at least a moderate range, has a constant elasticity form. Were that to be the case, and utilizing the same model and assumptions used by the authors, the Alliance price increase in the above example would be approximately 22.5% instead of the 12.5% shown above for business class and 16.7% instead of the 10% shown above for unrestricted coach/economy class.

34. These calculations are described further in Attachment B to this Statement. Attachment B provides results using alternative demand elasticities to check the sensitivity of the post-Alliance price increases (Table B-2). It then provides results using actual estimates of AA and BA shares on particular routes, including U.S. cities to Heathrow and Gatwick considered together and to Heathrow alone. The range of predicted fare increases, using the elasticities of 1.0 for business class and 1.25 for unrestricted coach/economy class on these routes, is shown in Tables B-3 through B-8.

35. As shown in Attachment B, the price effects calculated, under the authors' model of competitive interaction, are larger if the route demand takes a constant elasticity form rather than a linear form. For a variety of reasons, the most appropriate demand curve "shape" (and, therefore, the likely range of predicted price effects under the authors' model) lies between the linear and constant elasticity cases. Therefore, based on Tables B-3 through B-8, the business class fare increases, under the authors' model, would likely exceed 10% on all the routes, and in some cases substantially exceed that level.

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[38] The "shape" of the demand curve matters substantially in terms of the predicted magnitude of the fare increases. One type of demand curve is one in which demand falls off linearly: any given (e.g. $25) fare increase will result in the same reduction in traffic (e.g. 1000 passengers). Other shapes of the demand curve can generate larger increases in predicted price. For example, if the demand curve has constant elasticity, then successive increases in fare will produce smaller (in terms of the absolute number of units) decreases in demand (e.g., 1000, 960, ...).

3. Using Differentiated Products Methodology As A Sensitivity Test

36. A "differentiated products" model can be used to "test" the validity of the above corrections to the authors' analyses. The "differentiated products" methodology is used by U.S. antitrust agencies in industries where customers view the products as having distinct, different characteristics. In this setting, each of the suppliers will have, to some degree, a pricing choice.[39] This is because a small increase in its price by a firm, even if not matched by rivals, would cause the loss of some *but not all* of the firm's customers; many of those customers who particularly value the (perceived) distinctive characteristics of the product will remain as customers.

37. For example, in considering a fare increase an airline should evaluate the *tradeoff* between the reduction in its profits from losing passengers (i.e., the number of passengers lost times its profit per passenger) versus the increase in its profits, due to the increased fare, from each of the passengers it retains. The profit-maximizing fare *just balances* these gains and losses.

38. Immunizing an alliance on overlapping routes will result in different magnitudes of the profit gains and losses in the above tradeoff (and, therefore, the differences in the profitability of a fare increase) than when the firms are not allied. Before the alliance, a key part of each airline's tradeoff was the number of passengers "lost" (and the profits from each such lost passenger) as a result of the fare increase. For some of those (lost) passengers, their best alternative was the alliance partner's flights. After the alliance, these passengers will be retained ("recaptured") within the alliance. Hence the *net* loss of passengers (net of "recapture") for a given fare increase will be less than what either firm on its own would have faced before the

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[39] There have been a number of articles which explain the "differentiated products" approach, including several by DOJ or FTC economists. These include: Gregory Werden, "Simulating Unilateral Competitive Effects from Differentiated Products Mergers," *Antitrust*, Spring, 1997, 27-31; Jonathan Baker, "Unilateral Competitive Effects Theories in Merger Analysis," *Antitrust*, Spring, 1997, 21-26, and Carl Shapiro, "Mergers with Differentiated Products," *Antitrust*, Spring, 1996.

alliance. Consequently, the alliance will now find it profitable to choose higher fares. The larger the pre-alliance shares of the partners, the greater will be the predicted fare increase resulting from these incentives.

39. The magnitude of the resultant fare change depends, *inter alia*, on the proportion of passengers lost from each airline that are recaptured by the other airline. The magnitude also depends on other factors, which include: (1) the firm's demand elasticity for the products; (2) the proportion of the "lost" customers which "remain in the industry";[40] (3) the effective number of remaining rivals;[41] and (4) the "shape" of the industry route demand curve.

40. Assuming linear demand, a cost/price ratio of 0.75, symmetric market shares of 25%, and an industry elasticity of 1.0 (for business class), I find the profit maximizing price increase to be approximately 4.6%.[42] With symmetric market shares of 25% and an industry elasticity of 1.25 (for unrestricted coach/economy class), the profit maximizing price increase is found to be approximately 4%. Using constant elasticity of demand, the 0.75 cost/price ratio, and the symmetric 25% market share assumption, the profit maximizing price increase is approximately

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[40] There are two basic steps in calculating this proportion. Suppose that a 1% fare increase for one airline results in it losing 2% of its passengers. Some portion of these passengers will no longer fly. If the industry demand elasticity is 1.0, then of that 2% reduction in the airline's passengers, 1% may be assumed to be lost to the industry (1.0 times the 1% price rise). This suggests that 1% of its former customers will go to other airlines ("remain in the industry") when the firm raises fares by 1%. A working assumption is that the partner will capture its "market share" of those lost customers that remain in the industry.

[41] In a differentiated products model the rivals are assumed to respond to a fare increase of the alliance firms with some increase of their own. The rivals may behave this way because, at their old fare levels, they would have increased demand as some passengers desert the alliance after its fare increases; this will render an increase in their fares more profitable than formerly. The magnitude of the rivals' price response depends on the concentration of *displaced* customers among rivals: the more concentrated, the larger the response. Note that the rivals' price response does not depend on coordinated interaction: it stems from each of the rivals' unilateral response to the changed circumstances facing it.

[42] I also assume a recapture rate proportional to the firms' traffic shares.

12.5% at an industry elasticity of 1.0 (for business class) and 11% at an elasticity of 1.25 (for unrestricted coach/economy class).

41. These calculations are described further in Attachment B, along with results using alternative demand elasticities and cost/price values to check the sensitivity of the post-Alliance price increases (Table B-9), and results using AA and BA shares on particular routes. The range of predicted fare increases using the 0.75 cost/price ratio and the elasticities of 1.0 for business class and 1.25 for unrestricted coach/economy class on the U.S.-London routes is shown in Tables B-10 through B-15.

42. The results from the differentiated products model reinforce those from the corrected critical elasticity approach (see paragraph 35 above). Using cost/price ratios in the indicated range, there are significant predicted fare increases on all the routes, particularly for business class fares. In particular, by weighing the linear and constant elasticity cases, predicted fare increases of 10% or more – frequently substantially more – are found on all routes except LAX - London. Further, to the extent that Heathrow slot constraints affect rivals' responses, the calculated fare increases are understated. Hence, the differentiated products "sensitivity tests" support the conclusion that the authors' model, when corrected for logical inconsistencies, predicts significant fare increases.

IV. Summary

43. The critical loss and critical elasticity analyses presented in the AA/BA Appendices are incorrect. When they are corrected, the models sponsored by AA/BA predict that post-approval it would be profitable for the Alliance to raise fares significantly for those passengers traveling between the United States and London.

Attachment A
CURRICULUM VITAE

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EDUCATION

1970 Ph.D., Economics, Northwestern University
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EXPERIENCE

Dr. Reynolds is Chairman of Competition Economics, Inc. which he co-founded in 1997. Previously, he was Executive Vice President of Econsult Corporation, from 1992-1996, and a Senior Vice President of ICF Consulting Associates, which he joined in 1981. Dr. Reynolds was previously employed at the Antitrust Division of the Department of Justice as Assistant Director and Senior Economist in the Economic Policy Office, where he both supervised research in antitrust policy and was actively involved in DOJ investigations. His work at DOJ included being chief staff economist on U.S. v AT&T until 1978. Since leaving DOJ, he has specialized in statistical and theoretical analysis of industrial organization, public and regulatory policy issues, and antitrust problems. He has been engaged to do such research by both private and federal government clients.

He has been Visiting Associate Professor at Cornell University, 1981 where he taught courses in Economics of Regulation and Microeconomic Theory. He has also been Visiting Lecturer at the University of California at Berkeley, 1976-77 where he taught courses in Industrial Organization, Regulation, Antitrust, and Micro- and Macro-Economic Theory.

He has been both Assistant (1969-73) and Associate (1973-75) Professor of Economics at the University of Idaho where he taught courses in Intermediate and Graduate Micro- and Macro-Economic Theory, and Graduate Seminars in Price Theory, Regulation, and Statistics.

SELECTED PUBLICATIONS

"Oligopolistic Product Withholding In Ricardian Markets," with R. T. Masson and Ram Mudambi, *Bulletin Of Economic Research*, 1994.

"Oligopoly in Advertiser - Supported Media," with R. Masson and R. Mudambi, *Quarterly Review of Economics and Business*, 1990.

"Efficient Regulation with Little Information: Reality in the Limit?" with J. Logan and R. Masson, *International Economic Review*, 1989.

"The Competitive Effects of Partial Equity Interests and Joint Ventures," with B. Snapp, *International Journal of Industrial Organization*, 1987.

"Preying for Time," with D. Easley and R. Masson, *Journal of Industrial Economics*, 1985; reprinted in Geroski, Philips, and Uplh, eds., *Oligopoly, Competition and Welfare*, Basil Blackwell, 1985.

"Competition and Antitrust in the Petroleum Industry: An Application of the Merger Guidelines," with G. Hay, in *Antitrust and Regulation: Essays in Memory of John J. McGowan*, F. Fisher, editor, MIT Press, 1985.

"Contestable Markets: An Uprising in Economics, A Comment," with M. Schwartz, *American Economic Review*, 1983.

"Losses from Merger: The Effects of a Change in Industry Structure on Cournot-Nash Equilibrium," with S. Salant and S. Switzer, *Quarterly Journal of Economics*, 1983; reprinted in A. Daugherty, editor, *Cournot Oligopoly, Characterizations and Applications*, Cambridge University Press, 1988; reprinted in L. Philips, editor, *Applied Industrial Economics*, Cambridge University Press, *1998*.

"The Effects of Antitrust Enforcement: Theory and Measurement," *Georgetown Law Journal*, June 1980.

"Critique of J. Fred Weston's `Industrial Concentration, Mergers and Growth'," *Conglomerate Mergers and Public Policy*, 1981.

"The Effects of Regulation: The Case of Oil Pipelines," invited paper, *American Statistical Association, Proceedings*, 1979.

"Appraising Alternatives to Regulation for Natural Monopolies," with L. Lewis, in *Oil Pipelines and Public Policy*, American Enterprise Institute, 1979.

"Statistical Studies of Antitrust Enforcement," with R. Masson, invited paper, *American Statistical Association Papers and Proceedings*, 1977.

"The Economics of Potential Competition," with B. Reeves, in Masson and Qualls, eds., *Essays in Industrial Organization in Honor of Joe Bain*, Ballinger, 1976; reprinted in Siegfried and Calvani, eds., *Economic Analysis and Antitrust Law*, Little Brown, 1978.

OTHER RESEARCH ACTIVITIES

Dr. Reynolds has presented papers at various meetings of the Econometric Society, NBER Conferences in Industrial Organization, other professional meetings and various universities [e.g., Yale, Berkeley, Stanford, Pennsylvania, Cornell, Toronto, International Institute for Management (Berlin)].

Dr. Reynolds has served as:

- Chairman and discussant at meetings of the Econometric Society and Telecommunications Policy Research Conference.

- Member, Editorial Advisory Board, *Managerial and Decision Economics.*

- Reviewer for the National Science Foundation, *Rand Journal of Economics*, *International Economic Review*, *International Journal of Industrial Organization*, *Journal of Industrial Economics*, and *American Economic Review.*

- Invited participant in the University of Chicago Conference on Regulation, 1970; Dartmouth Conference on Regulation, 1972; University of Pennsylvania Conference on Antitrust Law and Economics, 1978; University of Virginia-MSS Conference on New Directions in Theoretical Industrial Organization, 1979; NBER (Northwestern) Conference on Information and Strategic Behavior in Economics, 1980; NBER (Berkeley) Conference in Theoretical Industrial Organization, 1980; Oxford Conference in Theoretical Industrial Organization, 1984.

PROFESSIONAL AFFILIATIONS/AWARDS

Member of:

American Economic Association
Econometric Society
Royal Economic Society
AAAS
American Statistical Association
European Association for Research in Industrial Economics (EARIE)
Society for the Promotion of Economic Theory
Mathematical Association of America
American Mathematical Association

Awards:

AT&T Post-Doctoral Grant, 1971-72
Brookings Institutional Grant to Study the Regulated Industries, 1968-69
NDEA Fellow, 1965-69
Dow-Jones (*Wall Street Journal*) Award for Outstanding Business School Graduate, 1965

Attachment B

Fare Increase Calculations Using
Revised Critical Elasticity and Differentiated Products Methods

1. Revised Critical Elasticity Technique

Post-Alliance fare increases are calculated based on the demand model of AA/BA Appendix A5. The analysis solves for the (pre and post-Alliance) equilibrium and then computes the corresponding fare increases. A firm's profit V is given by equation (2) in Appendix A5. Hence,

A.1. $V(p,p_0,s) = (p-c)(Q(p)-(1-s)Q(p_0))$

where c is the constant marginal cost, p_0 is the pre-Alliance price, p is the price set by the Alliance, and s is the partners' combined share pre-Alliance. In equilibrium, for the firms' prices to be profit maximizing the following holds.

A.2. $V_1(p,p,s) \leq 0$

where p is the equilibrium price and V_1 is the partial derivative of V with respect to the first variable.

Denote the elasticity facing each firm pre-Alliance as n_f. Then, the equilibrium price will equal:[43]

A.3. $p = c/(1-1/n_f)$

Post-Alliance, equations like A1.-A3 apply to the Alliance. However, the demand elasticity facing the Alliance will be lower than that facing the separate firms as the Alliance will

[43] The following equations assume that all firms charge the same price at the level which is profit-maximizing for the largest firm in the market.

have a larger share of the route's demand. Denoting the post-Alliance "firm" elasticity as n_f', the post-Alliance price will satisfy:

A.3'. $p' = c/(1-1/n_f')$

so that the change in the price is given by

A.4. $p'/p = (1-1/n_f)/(1-1/n_f')$

When route demand is a linear function of the price (case considered in Appendix A.5) the post-Alliance change in price is given by

A.5. $p'/p = 1 + \underline{s}/(2e)$

where $\underline{s}$ is the pre-Alliance share of the smaller (one with the smaller share of the route) partner on the route and e is the (absolute value of) "market" (OD route) elasticity. When demand takes a constant elasticity form, an explicit solution for the change in price becomes more complex. However, computing it is fairly straightforward: the attached (Awk) computer program ("revcritelast.awk") in Table B-1 generates the results. In particular, Table B-2 table shows the calculated price increases for both the constant elasticity and linear demand specifications using alternative values of shares and elasticities. Tables B-3 through B-8 show results using "U.S. - London" route and fare class shares calculated for AA and BA,[44] and using demand elasticities

[44] The route and fare class shares are approximated using bookings data for the year 2000 supplied by Northwest Airlines. The fare classes included in these calculations are the non-discounted categories specified in IATA Resolution 728: the J and C categories for business class and the Y, S, and W categories for economy/coach class. Following the assumptions of the AA/BA Appendices authors, "NYC" was defined as including EWR and JFK airports, and "CHI" was defined as including ORD. The authors of AA/BA Appendices A and A.1 through A.6 do not define the specific fare class codes that they include in the "J-class" or "Y-class" categories. Calculating business class shares based only on J fare class bookings would have resulted in larger total Alliance shares on all of the U.S. - London routes, and calculating economy/coach shares using only Y fare class bookings would have resulted in larger total

of 1.0 for business class and 1.25 for unrestricted coach/economy class.

2. Differentiated Products Methodology

This section describes the formulation and results of the differentiated products model. The pre-merger equilibrium conditions are based on each firm maximizing its profits independently. The post-merger equilibrium conditions are based on the Alliance maximizing its profits jointly and the rival firms maximizing their profits independently.

Pre-Alliance Equilibrium

Prior to the Alliance, a firm i will be faced with the following profit function in a particular "market":

$$V_i = q_i * (p_i - c_i)$$

where:

p_i = price for firm i

q_i = quantity sold for firm i

c_i = marginal cost for firm i

The condition for maximizing profits is as follows:

$$p_i = c_i * n_i/(1+n_i)$$

where:

n_i = Elasticity of demand for firm i = $(dq_i/q_i) / (dp_i/p_i)$

Alliance shares on most of the U.S. - London routes.

Table B-1
Computer Program revcritelast.awk

```
BEGIN{ ts=time()

########## Route demand elasticity(s) to be used
       nlray[1]=.65
       nlray[2]=1
       nlray[3]=1.25
       nlray[4]=1.5
       nlray[5]=2

########## Share of largest firm to be used

       for(m=1;m<=50;m+=5){
         sh[m]=.24 +(.01*m)
         print m" " sh[m]}
##########

#       Maximum Constant elasticity price increase is 500%

       p1=1        # initial price
       Q1=10       # industry quantity at initial price level
                     # Results do not depend on the initial price/quantity
##########

 for(p in nlray){           # this loop extends to final 2 lines of the program
  for(r in sh){             # this loop also extends to final 2 lines

   slp[p]=-nlray[p]*(Q1/p1)  # slope of industry demand at initial price
   cost[p][r]= p1 +(sh[r]*Q1)*(1/slp[p])

   if((2*sh[r])<1){
     mpartsh[r]=sh[r]}
   else{
     mpartsh[r]=(1-sh[r]-.01)}

   print "             ASSUMPTIONS in Case "p":   " > "results.res"
   print "          Route Elasticity: " nlray[p] >"results.res"

     # elasticity and shares are measured at the pre alliance price level

   print "      " >"results.res"
   print "             IMPLICATIONS " >"results.res"
   print " Linear Demand Slope: " slp[p]  >"results.res"
   print "      " >"results.res"
   print "      " >"results.res"

 ##################################
 ##    Linear Demand Case
 ##################################

   for(i=.01;i<=mpartsh[r];i+=.01){

     for(j=.001;j<=1.0;j+=.001){
       p2=p1+j
       q[p][r]= (sh[r]+i)*Q1+(slp[p]*j)
       vL[p][r]= (p2-cost[p][r])*q[p][r]

       if(vL[p][r]>= maxVL[i][p][r]){
          maxVL[i][p][r]=vL[p][r]
```

```
            rayL[i][p][r]=(j*100) }
          else{
              break}
                                                              }}
   print "                 Linear Demand Results" >"results.res"
   print "    Shares "                            >"results.res"
   print "Firm1  Partner      Price Increase"     >"results.res"
   for(k in rayL){
      if((k +sh[r])<1){
      printf " %.2f   %.2f               %3.2f\n",sh[r], k, rayL[k][p][r] >"results.res"}}

##################################
##  Constant Elasticity Demand Case
##################################

   for(i=.01;i<=mpartsh[r];i+=.01){

      for(j=.001;j<=5.00;j+=.001){
        p2E=p1+j
        qE[p][r]= (sh[r]+i)*Q1+10*(((p1+j)^-(n1ray[p]))-((p1)^(n1ray[p])))

        vLE[p][r]= (p2E-cost[p][r])*qE[p][r]

        if(vLE[p][r] >= maxVLE[i][p][r]){
            maxVLE[i][p][r]=vLE[p][r]
            rayLE[i][p][r]=(j*100) }
         else{
           break}
                                                           }}
    print "          " >"results.res"
    print "          " >"results.res"
    print "                 Constant Demand Elasticity Results" >"results.res"
    print "    Shares"                                          >"results.res"
    print " Firm 1 Partner       Price Increase"                >"results.res"
    for(k in rayLE){
      if((k+sh[r])<1){
         printf " %.2f   %.2f              %3.2f\n",sh[r],k,rayLE[k][p][r] >"results.res"}}
    print "          " >"results.res"
    print "          " >"results.res"
    print "          " >"results.res"

}}    ### closes two major "for" loops

##########
    tn=time()
    print "Seconds:  " tn -ts
       }
```

Table B-2

Predicted Fare Increases Using Revised Critical Elasticity Technique And Alternative Demand Elasticities

Assumptions			Change in Prices for Firms 1 and 2 Combined	
Industry Elasticity	Share Firm 1	Share Firm 2	Linear Demand	Constant Elasticity Demand
0.65	15%	30%	11.5%	24.0%
1.0	15%	30%	7.5%	12.8%
1.25	15%	30%	6.0%	9.6%
1.5	15%	30%	5.0%	7.7%
2.0	15%	30%	3.8%	5.5%
0.65	25%	50%	19.2%	120.5%
1.0	25%	50%	12.5%	41.4%
1.25	25%	50%	10.0%	27.4%
1.5	25%	50%	8.3%	20.4%
2.0	25%	50%	6.3%	13.5%

Table B-3

Predicted Fare Increases Resulting from AA/BA Alliance On BOS - LON Routes Using Revised Critical Elasticity Technique

	Assumptions			Change in Prices for AA and BA Combined	
	Industry Elasticity	Pre-Alliance Shares: AA	BA	Linear Demand	Constant Elasticity Demand
Heathrow + Gatwick					
Business	1.0	26%	49%	13.0%	42.8%
Unrestricted Coach	1.25	19%	43%	7.6%	15.9%
Heathrow only					
Business	1.0	30%	57%	15.0%	81.9%
Unrestricted Coach	1.25	25%	56%	10.0%	32.6%

Table B-4

Predicted Fare Increases Resulting from AA/BA Alliance On CHI - LON Routes Using Revised Critical Elasticity Technique

	Assumptions			Change in Prices for AA and BA Combined	
	Industry Elasticity	Pre-Alliance Shares: AA	BA	Linear Demand	Constant Elasticity Demand
Heathrow + Gatwick					
Business	1.0	44%	26%	13.0%	36.6%
Unrestricted Coach*	1.25	18%	20%	4.4%	6.5%
Heathrow only					
Business	1.0	44%	26%	13.0%	36.6%
Unrestricted Coach*	1.25	18%	20%	4.4%	6.5%

* Largest pre-Alliance unrestricted coach shares used in the calculations:

CHI-H/G	27% (UA)
CHI-LHR	27% (UA)

Table B-5

Predicted Fare Increases Resulting from AA/BA Alliance On DFW - LON Routes Using Revised Critical Elasticity Technique

	Assumptions			Change in Prices for AA and BA Combined	
	Industry Elasticity	Pre-Alliance Shares: AA	BA	Linear Demand	Constant Elasticity Demand
Heathrow + Gatwick					
Business	1.0	69%	25%	12.5%	127.3%
Unrestricted Coach	1.25	47%	34%	13.6%	42.7%
Heathrow only					
Business	1.0	58%	21%	10.5%	41.4%
Unrestricted Coach	1.25	42%	10%	4.0%	7.3%

Table B-6

Predicted Fare Increases Resulting from AA/BA Alliance On LAX - LON Routes Using Revised Critical Elasticity Technique

	Assumptions			Change in Prices for AA and BA Combined	
	Industry Elasticity	Pre-Alliance Shares: AA	BA	Linear Demand	Constant Elasticity Demand
Heathrow + Gatwick					
Business	1.0	17%	24%	8.5%	13.5%
Unrestricted Coach*	1.25	15%	30%	4.8%	7.8%
Heathrow only					
Business	1.0	17%	23%	8.5%	13.3%
Unrestricted Coach*	1.25	15%	31%	4.8%	7.9%

* Largest pre-Alliance unrestricted coach shares used in the calculations:

LAX-H/G	33% (VS)
LAX-LHR	34% (VS)

Table B-7

Predicted Fare Increases Resulting from AA/BA Alliance On MIA - LON Routes Using Revised Critical Elasticity Technique

	Assumptions			Change in Prices for AA and BA Combined	
	Industry Elasticity	Pre-Alliance Shares: AA	BA	Linear Demand	Constant Elasticity Demand
Heathrow + Gatwick					
Business	1.0	25%	49%	12.5%	40.1%
Unrestricted Coach	1.25	11%	59%	4.4%	11.3%
Heathrow only					
Business	1.0	39%	52%	19.5%	130.9%
Unrestricted Coach	1.25	22%	69%	8.8%	43.2%

Table B-8

Predicted Fare Increases Resulting from AA/BA Alliance On NYC - LON Routes Using Revised Critical Elasticity Technique

	Assumptions			Change in Prices for AA and BA Combined	
	Industry Elasticity	Pre-Alliance Shares: AA	BA	Linear Demand	Constant Elasticity Demand
Heathrow + Gatwick					
Business	1.0	16%	42%	8.0%	17.5%
Unrestricted Coach*	1.25	12%	27%	4.0%	6.0%
Heathrow only					
Business	1.0	18%	44%	9.0%	21.4%
Unrestricted Coach	1.25	13%	27%	5.2%	7.8%

* Largest pre-Alliance unrestricted coach share used in the calculations:

NYC-H/G 29% (VS)

Thus, the pre-merger equilibrium conditions for the industry are as follows:

$p_i = c_i * n_i / (1+n_i)$ for each firm i=1 to n in the industry

Post-Alliance Equilibrium

With the Alliance of firm 1 and firm 2, the Alliance will be faced with the following profit function:

$$V_{12} = q_1 * (p_1 - c_1) + q_2 * (p_2 - c_2)$$

The conditions for the Alliance to maximize its profit will be as follows:

$$p_1 = (c_1 + R_{21} * (p_2-c_2)) * n_1/(1+n_1)$$
$$p_2 = (c_2 + R_{12} * (p_1-c_1)) * n_2/(1+n_2)$$

where:

R_{12} = recapture rate for firm 1 of customers lost by firm 2

R_{21} = recapture rate for firm 2 of customers lost by firm 1

An interpretation of these conditions is that effective marginal cost of each firm equals its direct marginal cost plus the opportunity cost of sales that would be recaptured by the partner, where the opportunity cost is the margin that the partner would earn on such sales.

Thus, the post-Alliance equilibrium conditions for the industry are as follows:

$$p_1 = (c_1 + R_{21} * (p_2-c_2)) * n_1/(1+n_1)$$
$$p_2 = (c_2 + R_{12} * (p_1-c_1)) * n_2/(1+n_2)$$

$p_i = c_i * n_i / (1+n_i)$ for each firm i=3 to N

Model Specification

The solution of the model depends on the specification of the parameters, in particular the specification of the following: 1) demand curve formulation; 2) industry elasticity; 3) cost/price ratio (or, equivalently, firm elasticity of demand); 4) recapture rate; and 5) pre-Alliance shares;

With respect to the demand curve, the following two specifications are considered:

Linear demand:	$q = A + B*p$
Constant elasticity of demand:	$q = A * p\^{}B$

I assume a recapture rate proportional to the firm's market shares.[45] If the market shares of AA and BA were 25% each, for example, this yields a "gross" recapture rate of 33% for firms 1 and 2.[46] With respect to marginal costs, I assume constant marginal costs. I also assume a cost/price ratio of 0.75 and 0.85 (firm elasticity of demand of 4.0 and 6.67, respectively), and industry elasticity in the range between 0.65 and 2. These figures are consistent with empirical studies cited in the Statement.

The rivals may respond to a price increase by the Alliance firms with some increase of their own. This is because the rivals' demand will increase (shift outward) as customers desert the Alliance firms after their price increases. The rivals' increased business may render an

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[45]If the products of the Alliance are "closer" to each other than their rivals in the industry, the recapture rates may be higher than those based on quantity shares.

[46]The "gross" recapture rate is the share of those lost customers who remain in the industry and who buy the brand of the partner. For firm 1, this rate is approximated by (firm2's share) / (100% - firm1's share). The "net" recapture rate is the share of *all* lost customers who buy the brand of the partner. Thus, assuming an industry elasticity of 1.0, and a firm elasticity of 4.0, one quarter of passengers will discontinue flying, resulting in net recapture of 25%.

increase in their price more profitable. The magnitude of the rivals' response depends on the concentration of displaced customers among rivals– the more concentrated, the larger the response. I assume four rivals with equal pre-merger market shares. Note that under the constant elasticity of demand specification the rivals' post-Alliance price is the same as the pre-Alliance price.

Results

Table B-9 summarizes the results for both the constant elasticity and linear demand specifications using alternative values of shares, elasticities, and cost/price ratio.[47] Tables B-10 through B-15 show results using route and fare class shares calculated for AA and BA, and using demand elasticities of 1.0 for business class and 1.25 for unrestricted coach/economy class.[48]

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[47]I use an iterative approach to determine the post-merger equilibrium. The outline of this method is as follows: Given the pre-merger market shares and industry and firm elasticities, I compute the new optimal price for firm 1 and recalculate the demand for firms 2 through n. I then determine the new optimal price for firm 2 and recalculate the demand of firms 1 and 3 through n. Next, I compute the new optimal price for firm 3 and recalculate the demand for other firms. This is repeated for firms 4, 5, and 6. This completes the first iteration. Subsequent iterations follow the same approach, with the starting point being the result of the previous iteration. The results shown are for 8 iterations. Although the model converges in 8 iterations for most of the specifications, when the price increase is more than 100%, as in some of the constant elasticity of demand specifications, the convergence takes longer. Thus, the results shown are underestimates for cases with very high price increase.

[48] The results with the linear demand model have been verified using the simulation calculator provided by Crooke, Froeb & Tschantz (at the web site http://mss.math.vanderbilt.edu/~pscrooke/MSS/linearmerger.html). Although it allows for only one rival firm, the post-merger price increase given by the calculator is within 10% of my results for each combination shown in Tables B-9 through B-15.

Table B-9

Predicted Fare Increases Using Differentiated Products Methodology And Alternative Demand Elasticity And Cost/Price Assumptions

Assumptions				Change in Prices for Firms 1 and 2 Combined	
		Pre-Alliance			
Industry Elasticity	Firm Cost/Price	Share Firm 1	Share Firm 2	Linear Demand	Constant Elasticity Demand
0.65	0.75	15%	30%	4.6%	12.3%
1.0	0.75	15%	30%	3.8%	10.4%
1.25	0.75	15%	30%	3.0%	8.0%
1.5	0.75	15%	30%	2.9%	8.1%
2.0	0.75	15%	30%	2.2%	6.0%
0.65	0.6	15%	30%	6.0%	23.1%
1.0	0.6	15%	30%	4.4%	16.7%
1.25	0.6	15%	30%	3.1%	11.3%
1.5	0.6	15%	30%	2.7%	9.6%
2.0	0.6	15%	30%	1.2%	4.2%
0.65	0.75	25%	50%	13.2%	45.0%
1.0	0.75	25%	50%	10.3%	33.7%
1.25	0.75	25%	50%	8.6%	27.7%
1.5	0.75	25%	50%	7.3%	22.8%
2.0	0.75	25%	50%	5.1%	15.3%
0.65	0.6	25%	50%	16.0%	97.7%
1.0	0.6	25%	50%	10.8%	53.8%
1.25	0.6	25%	50%	8.1%	36.4%
1.5	0.6	25%	50%	5.9%	24.4%
2.0	0.6	25%	50%	2.5%	9.2%

Table B-10

Predicted Fare Increases Resulting from AA/BA Alliance On BOS - LON Routes Using Differentiated Products Methodology

Assumptions					Change in Prices for Firms 1 and 2 Combined	
	Industry Elasticity	Firm Cost/Price	Pre-Alliance Shares AA	Pre-Alliance Shares BA	Linear Demand	Constant Elasticity Demand
Heathrow and Gatwick:						
Business	1.0	0.75	26%	49%	10.4%	34.3%
	1.0	0.6	26%	49%	11.0%	54.8%
Unrestricted	1.25	0.75	19%	43%	5.2%	15.0%
Coach	1.25	0.6	19%	43%	5.2%	20.5%
Heathrow Only:						
Business	1.0	0.75	30%	57%	18.0%	75.4%
	1.0	0.6	30%	57%	17.2%	120.6%
Unrestricted	1.25	0.75	25%	56%	10.7%	36.6%
Coach	1.25	0.6	25%	56%	9.6%	46.6%

Table B-11

Predicted Fare Increases Resulting from AA/BA Alliance On CHI - LON Routes Using Differentiated Products Methodology

	Assumptions				Change in Prices for Firms 1 and 2 Combined	
	Industry Elasticity	Firm Cost/Price	Pre-Alliance Shares AA	Pre-Alliance Shares BA	Linear Demand	Constant Elasticity Demand
Heathrow and Gatwick:						
Business	1.0	0.75	44%	26%	8.8%	27.3%
	1.0	0.6	44%	26%	9.5%	43.6%
Unrestricted	1.25	0.75	18%	20%	2.6%	6.8%
Coach	1.25	0.6	18%	20%	2.7%	9.7%
Heathrow Only:						
Business	1.0	0.75	44%	26%	8.8%	27.3%
	1.0	0.6	44%	26%	9.5%	43.6%
Unrestricted	1.25	0.75	18%	20%	2.6%	6.8%
Coach	1.25	0.6	18%	20%	2.7%	9.7%

Table B-12

Predicted Fare Increases Resulting from AA/BA Alliance On DFW - LON Routes Using Differentiated Products Methodology

	Assumptions				Change in Prices for Firms 1 and 2 Combined	
	Industry Elasticity	Firm Cost/Price	Pre-Alliance Shares AA	Pre-Alliance Shares BA	Linear Demand	Constant Elasticity Demand
Heathrow and Gatwick:						
Business	1.0	0.75	69%	25%	30.6%	139.5%
	1.0	0.6	69%	25%	23.9%	223.1%
Unrestricted	1.25	0.75	47%	34%	11.6%	40.6%
Coach	1.25	0.6	47%	34%	10.4%	51.4%
Heathrow Only:						
Business	1.0	0.75	58%	21%	11.1%	37.4%
	1.0	0.6	58%	21%	11.4%	59.5%
Unrestricted	1.25	0.75	42%	10%	2.7%	7.3%
Coach	1.25	0.6	42%	10%	2.8%	10.2%

Table B-13

Predicted Fare Increases Resulting from AA/BA Alliance On LAX - LON Routes Using Differentiated Products Methodology

	Assumptions				Change in Prices for Firms 1 and 2 Combined	
	Industry Elasticity	Firm Cost/Price	Pre-Alliance Shares AA	Pre-Alliance Shares BA	Linear Demand	Constant Elasticity Demand
Heathrow and Gatwick:						
Business	1.0	0.75	17%	24%	3.2%	8.4%
	1.0	0.6	17%	24%	3.7%	13.5%
Unrestricted	1.25	0.75	15%	30%	3.0%	8.0%
Coach	1.25	0.6	15%	30%	3.1%	11.3%
Heathrow Only:						
Business	1.0	0.75	17%	23%	3.1%	8.1%
	1.0	0.6	17%	23%	3.6%	13.0%
Unrestricted	1.25	0.75	15%	31%	3.0%	8.2%
Coach	1.25	0.6	15%	31%	3.2%	11.6%

Table B-14

Predicted Fare Increases Resulting from AA/BA Alliance On MIA - LON Routes Using Differentiated Products Methodology

Assumptions					Change in Prices for Firms 1 and 2 Combined	
	Industry Elasticity	Firm Cost/Price	Pre-Alliance Shares AA	Pre-Alliance Shares BA	Linear Demand	Constant Elasticity Demand
Heathrow and Gatwick:						
Business	1.0	0.75	25%	49%	9.9%	32.2%
	1.0	0.6	25%	49%	10.5%	51.4%
Unrestricted	1.25	0.75	11%	59%	4.5%	13.4%
Coach	1.25	0.6	11%	59%	4.4%	18.2%
Heathrow Only:						
Business	1.0	0.75	39%	52%	22.3%	116.8%
	1.0	0.6	39%	52%	20.6%	186.9%
Unrestricted	1.25	0.75	22%	69%	17.6%	65.6%
Coach	1.25	0.6	22%	69%	13.5%	76.8%

Table B-15

Predicted Fare Increases Resulting from AA/BA Alliance On NYC - LON Routes Using Differentiated Products Methodology

	Assumptions				Change in Prices for Firms 1 and 2 Combined	
	Industry Elasticity	Firm Cost/Price	Pre-Alliance Shares AA	Pre-Alliance Shares BA	Linear Demand	Constant Elasticity Demand
Heathrow and Gatwick:						
Business	1.0	0.75	16%	42%	4.9%	13.8%
	1.0	0.6	16%	42%	5.5%	22.0%
Unrestricted	1.25	0.75	12%	27%	2.3%	6.0%
Coach	1.25	0.6	12%	27%	2.4%	8.6%
Heathrow Only:						
Business	1.0	0.75	18%	44%	5.8%	16.9%
	1.0	0.6	18%	44%	6.5%	26.9%
Unrestricted	1.25	0.75	13%	27%	2.4%	6.5%
Coach	1.25	0.6	13%	27%	2.6%	9.2%

Attachment C

"Evidence" on Switching Cited in AA/BA Appendix A

This Statement has focused on the "critical loss" and "critical elasticity" analyses presented by the authors of the AA/BA Appendices. These analyses purport to show that "it would take very little passenger switching to rival carriers (and to lower fare classes) in order to render unprofitable any unwarranted fare increase by the Alliance."[49] This Statement has demonstrated critical deficiencies in the AA/BA analyses, and has shown that corrected analyses, and also alternative methods, instead indicate that it would be profitable for the proposed AA/BA Alliance to significantly increase fares.

In addition to presenting these "critical loss" and "critical elasticity" analyses, the authors present "evidence" that they claim "makes it likely" that the *amount* of actual passenger diversion resulting from a fare increase would be unprofitable (i.e., "that AA/BA would find a fare increase unprofitable by virtue of the resulting passenger diversion"[50] greater than the supposed "critical loss" amounts). For example, the authors note that "critical to the analysis is just how many passengers likely would switch in response to a contemplated fare increase" and claim that the information that they present demonstrates that "the number of passengers willing to switch is substantial, and it is increasing."[51]

However, although "critical to the analysis", the authors present no evidence that actually *quantifies* the number of passengers who would be expected to divert to other carriers (or fare classes) in response to an Alliance-related AA/BA fare increase. Instead, the authors present information and survey data that simply is not useful for estimating "how many passengers likely would switch." In particular:

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[49] Appendix A, pages 24-25.
[50] Appendix A, page 25.
[51] Appendix A, page 2.

- the authors describe a supposed "blurring of the lines" between "time-sensitive" and "non-time-sensitive" business travelers;

- the authors describe "factors" (including relative prices) that "influence" the demand for business travelers;

- the authors list numbers of non-stop and connecting flights on US-"London" city pairs operated by carriers other than AA and BA; and

- the authors present regression analyses that they claim "suggest that unrestricted fare passengers traveling between the US and London switch away from non-stop service, when non-stop fares increase relative to one-stop fares."

None of this material, however, directly answers the "critical question" of *how many* passengers likely would switch in response to a fare increase (i.e., the sensitivity of passengers or groups of passengers to changes in price). Further, much of the information is misleading and only serves to underscore the leading position of AA/BA on the US-London routes.

The authors devote pages 3-5 of Appendix A to a discussion of the "blurring" of "the line between time-sensitive and non-time sensitive passengers" in transatlantic travel. For example, on page 3 the authors cite a finding by the European Commission (EC) that "an increasing number of time-sensitive business passengers travel in economy class ..." However, this finding provides no information that would allow one to *quantify* the magnitude of particular effects on the AA/BA non-stop overlap routes such as the number of passengers that would switch in response to a change in fares.

Similarly, the discussion of relative price as a factor affecting business traveler decisions (pp. 11-12) only cites a survey of U.S. businesses which reports that most of the companies surveyed require employees to book the "lowest logical fare" (including the possibility of using connecting service). Based on this survey, the claim is then made that increased availability of connecting service in Open Skies markets will attract additional passengers. But this proposition provides no useful insight regarding the magnitude of substitution between fare classes or between non-stop and connecting service in response to changes in relative fares.

The discussion of "other", non-price factors influencing the demand of business travelers in AA/BA Appendix A is equally uninformative. For example, there are a number of quotes, cites, and assertions on pages 3-10, 12, and 14-17 of the Appendix to the effect that business travelers' decisions are influenced by corporate travel policies, schedule convenience, connection reliability, schedule change convenience, and corporate discounts. None of this information, however, tells anything about the sensitivity of passengers to changes in price. There is little doubt that there is some sensitivity, but the key question is how much? Although the Appendix A authors have sought to create the impression that demand by passengers in the highest fare classes would be very responsive to changes in price, and perhaps that this responsiveness has grown over time, they provide no real evidence.

Indeed, if there were really as much sensitivity to prices by passengers in the highest fare classes as the authors of Appendix A imply, one would expect that the existing structure of airline fares would be radically different. In contrast to the claim in Appendix A that airlines cannot differentiate between types of passengers, the structure of fares generally is designed to cause travelers to self select by choosing from a menu of fare choices. A noteworthy example, as noted in footnote 23 of Appendix A, is that BA "has introduced an additional class of service between business and coach, branded World Traveler Plus." Further, the authors' regression analyses and summary statistics suggest very large gaps among average F, J, and Y fares: during the authors' sample period F fares exceed J fares by an average of 60%, and J fares exceeded Y fares by 90%. The ratio of F fares to Y fares was more than 3 to 1.[52]

Other information provided in AA/BA Appendix A is simply misleading. The authors cite extensively to results from the *American Express Survey of Business Travel Mangement*

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52 Appendix A.1, Table 2, page 19.

2000-2001. That publication, however, reports on a survey that was "targeted" towards U.S. businesses that were likely already to have managed-travel programs.[53] Further, that survey is not specific to international travel.[54] In addition, the results of the survey are often misstated in Appendix A. On page 16 of the Appendix, for example, it says that "...68 percent of businesses [with "lowest logical fare" requirements and T&E spending of $25 million or more] *require* the purchase of non-refundable tickets..." (emphasis added).[55] A more accurate statement would be that survey respondents may include several requirements in their definition of "lowest logical fare", and that 68 percent of the companies in the high T&E category included purchasing non-refundable tickets as one of those requirements.[56]

Another example of misleading information is Table 1 and the discussion on pages 6-7 of the Appendix, which seek to demonstrate that unrestricted fare passengers consider more than just elapsed flight time. Table 1 shows the percentage of those passengers taking connecting service on the six AA/BA non-stop overlap routes for 1996-2000. Except for NYC-LON (1.6%), the quarterly average of the percentage taking connecting service ranged between 4.2% and 7.3% on four of the routes and was 17.5% for DFW-LON.[57] However, the information in this table appears to be based on the service of all carriers on these routes, including AA and BA. If so, then some fraction of the passengers in this Table would not be "lost" to the AA/BA Alliance in the event of a price increase but instead would be recaptured by the Alliance. This recapture

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[53] See Survey, page iv.
[54] As noted by the authors, "Because business travelers evaluate service alternatives for long-haul international trips differently than for short-haul domestic trips, DOT properly has questioned the probative value of domestic market evidence when analyzing the competitive effects of transatlantic alliances" (Appendix A, footnote 7, page 4).
[55] The previous sentence on page 16 of the survey may be more accurate: of all survey respondents "that require employees to seek out the lowest logical fare, 53 percent said they require employees to *consider* the purchase of non-refundable tickets" (emphasis added).
[56] See *American Express Survey of Business Travel Management 2000-2001*, p. B18. Other requirements identified by survey respondents included a set time window for low-fare search, staying over a Saturday night, using alternate airports, booking flights that make one stop with no change of plane, and using connecting flights.
[57] Table 1 of Appendix A also shows the quarterly maximum for each route, but does not show the quarterly minimum.

would be particularly significant on the DFW-LON route, for which Chicago and New York are leading intermediate points for the connecting service.

The information on the number of competing non-stop and connecting carriers provided at pages 18-21 of Appendix A does not support the authors' argument that these alternatives would prevent AA/BA from increasing fares. Rather, that information underscores the key position of AA/BA in the U.S.-London markets. For example, Table 3 shows that, except for the LAX-LON route, AA/BA account for more than 50 percent of non-stop "frequencies" on the Non-Stop Overlap routes. Together, AA and BA operate 75% of MIA-LON flights and 100% of DFW-LON.

Finally, the authors of Appendix A argue not only that the number of passengers willing to switch to non-Alliance service is "substantial," but also that the number has been "increasing" (Appendix A, page 2). However, even if those assertions are accepted, there are now and will continue to be passengers who demand and purchase the time-sensitive, unrestricted fare products offered by AA and BA.[58] Those consumers deserve a careful and correct investigation of the price effects of an alliance between AA and BA.

[58] The continuing passenger demand for unrestricted fares is one reason why the structure of airline fares,.which reflects substantial gaps among the prices offered for different travel products, has not collapsed. For example, the charts of NYC-London fares during 1996-2000 submitted by AA/BA do not show a significant narrowing among "F", "J", and "Y" fares over time. Instead, these charts appear to show that "F" and "J" fares have increased relative to unrestricted coach ("Y") (see AA/BA Appendix C, page 11).